Motorship

Registered in U. S. Patent Office and abroad

Obsolete and idle as a steamer —now a modern motorship

AFTER seven years idleness, the abandoned Shipping Board Steamer "Chestnut Hill" has been reconditioned throughout, and fitted with 2400-i.hp. McIntosh & Seymour Diesel Main Engine and two 150-s.hp. McIntosh & Seymour Diesel Auxiliaries.

As the modern 10237-ton-displacement Motor Tanker "Caliche", and with the dependability of her new power thoroughly proven by sea trials in a heavy gale, this vessel now carries fuel oil from California to the South American ports of the Anglo-Chilean Consolidated Nitrate Corporation.

The conversion was accomplished at very reasonable cost, and for all practical purposes the "Caliche" is now as reliable and desirable as a new tanker just off the ways.

MAY, 1928

PRICE 35c.

Motorship

Reg. U. S. Pat. Office and abroad.

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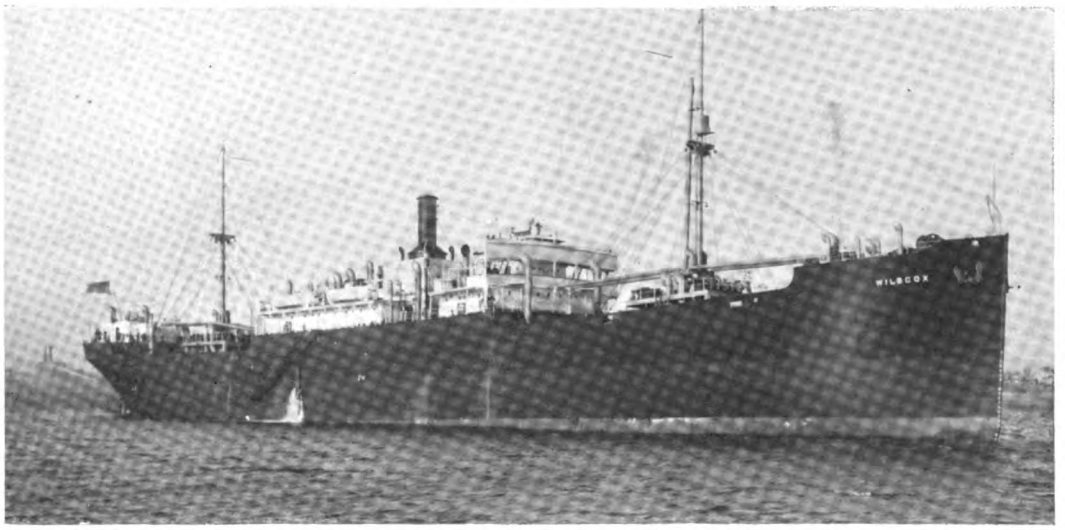
Volume XIII *May, 1928* *Number 5*

Congress and the U. S. Merchant Marine

THERE now seems to be every likelihood of a piece of legislation, which is in effect a revised Jones-White shipping bill being enacted into law before Congress recesses. Doubtless some minor modifications will first be made, but as a subsidy is not possible, it is one of the most constructive pieces of shipping legislation yet committed to the "Whole House of the state of the Union" by congressional committees. It could be further strengthened, but presumably the sponsors of the bill feel it necessary to compromise and to eliminate any clauses which would endanger its passing this session. MOTORSHIP has from time to time made suggestions on this vexed question of shipping legislation. Some of these have been incorporated in the new bill, and it is hoped that some additional recommendations will be adopted.



Completion of the first part of the U. S. Shipping Board's Dieselization programme is seen with the entry into service of the freighter Wilscox. If Congress passes further constructive legislation further building and conversion is probable

The new bill recognizes the necessity for the construction of new ships to replace vessels now owned by the Shipping Board and authorizes the Board to lay before Congress from time to time what new up-to-date cargo, combination cargo-passenger, and passenger ships are needed. The appropriations necessary to carry out the provisions and accomplish the purpose of the Act are authorized under Section 801, although no definite moneys are made available.

Quite a number of modifications have been made to the terms of the Construction Loan Fund, the maximum amount of which has been increased to $250,000,000. This money may now be loaned to private shipowners for reconditioning and remodeling existing ships, as well as for new construction, and this clause should encourage further Dieselizing of existing private vessels, for any new vessels built under the loan fund must be equipped with the most modern, the most efficient and the most economical engines, machinery and commercial appliances. This clause was put in the Merchant Marine Act of 1920 at our suggestion, and in the amendment of 1924, but was eliminated in the new Jones-White Bills as first submitted to the congressional committees. MOTORSHIP recommended that this clause be retained in order to ensure that any new vessels shall be equal in type to the latest foreign-built ships.

In our issue of October, 1927, we pointed out that when the Merchant Marine Act of 1920 became law it permitted moneys from the loan fund to be loaned to American shipowners at 2 per cent annum, but when Sections 11 and 12 were amended in 1924 the rate was increased to 4¼ per cent on foreign-going ships and 5¼ per cent on coastwise ships.

We further pointed out that due to change in financial conditions the Government was obtaining cash at 3¼ per cent, and that the interest rate should be changed to a flexible basis to allow shipowners to borrow money from the Government as cheaply as the Treasury could obtain it. This has been adopted in Section 301 of the new bill.

However, the rate of 5¼ per cent per annum still applies to any period in which a vessel is operating exclusively in coastwise trade or is inactive. Loans are now obtainable up to three-fourths of the cost of the vessel, three-fourths of the cost of reconditioning, remodeling, improving or equipping vessels already built.

Compensation will be given to vessels carrying ocean mails. These shall be steam or motor vessels divided into seven classes and the rate varies from $1.50 per nautical mile for vessels of 10 knots sea speed to $12.00 per nautical mile for ships of 24 knots sea speed. These, however, are the maximum rates, and contracts for carrying the mails are to be awarded to the lowest bidder.

Section 24 requires that all overseas mails to the United States shall, if practical, be carried on American-built vessels. In classifying the vessels for mail compensation a gross tonnage basis is used. This could be strengthened by adoption of the term "net-cargo tonnage," the ship's earning capacity.

Codification of Navigation and Shipping Law

THE Code itself, we are assured by the Honorable Wallace White, Chairman of the House Committee on Merchant Marine and Fisheries, to be presented to the House simultaneously with its presentation by the Honorable Wesley L. Jones, Chairman of the Committee on Commerce of the Senate, soon after the present Bills covering the general Merchant Marine policy have been reported on by this Committee, and agreed upon by the Senate. Senator Jones has been awaiting Mr. White's action in the matter.

Part I of the Bill, amending the proposed Code of the Navigation and Shipping Laws of the United States, accompanying this memorandum, covers the following subjects and Chapters of the Code:

Chapter 1, "Documented and Recorded Vessels";

Chapter 3, "Marine Inspection Service"; and

Chapter 4, "Officers and Pilots of Merchant Vessels."

None of the amendments suggested to Chapter 2, "Admeasurement of Vessels," has been thought suitable for inclusion in this Amending Bill, as all of them are for the purpose of securing greater uniformity of measurement, and would seem to be matters for international agreement, and in addition the present laws are not seriously attacked by those desiring changes.

Of the eighty-nine sections of the proposed Amending Bill included in Part I which is submitted separately to avoid delay, the first sixteen sections are directed to Chapter 1, "Documented and Recorded Vessels," and deal principally with the clarification and simplification of the present laws upon the subject of documentation of vessels, their marking and numbering, the home port of vessels of the United States, etc.

They, however, include two substantial changes in the present laws:

First, allowing a newly built vessel to be removed from the district in which she is built to her home port anywhere in the United States, instead of as at present only to a port in the same or adjacent State, upon her builder's certificate without being documented, but with proper supervision as to her seaworthiness for the contemplated voyage; and,

Second, the removal of yachts from their present classification as "documented vessels" and placing them under a "Special License for Yachts," retaining, however, for this class of vessels, all the privileges which they have enjoyed as documented vessels.

The amendments to Chapter 3, "Marine Inspection Service," (sections 17 to 68, inclusive, of the Bill), beside the simplification and clarification above referred to in case of Chapter 1, also look to some important changes in the present law, among which may be mentioned:

First, the extension of inspection authority, which is now confined by law to steam vessels, to various classes of motor-propelled vessels with proper reservations as to some of the smaller motor boats as well as motor fishing vessels and motor towing boats up to a certain tonnage;

Second, the liberalization of the present statute requirements as to life saving equipments, boilers and boiler plates and machinery, fire protection equipment, etc., by making these matters also subject to regulation by the Board of Supervising Inspectors with the approval of the Secretary of Commerce, thus allowing for some elasticity to provide for changes in conditions from year to year and to cover the special needs of widely different sections of the country;

Third, provision has also been made for a proper gas-free inspection of tankers propelled by machinery undergoing repairs to prevent the disastrous explosions of gas while these vessels are in process of repair.

In Chapter 4, "Officers and Pilots of Merchant Vessels" (Sections 69 to 89, inclusive, of the Bill), the requirements as to licensed officers, have been extended to motor-propelled vessels made subject to inspection as above stated, and certain changes also have been made in the requirements for obtaining a license.

It is also provided that the operators of all motor vessels not requiring licensed officers shall at least establish as a condition of their permit to operate such boats, that they are free from color blindness, have a reasonable acuity of vision, and a working knowledge of the Rules of the Road, including lights, and sound signals for vessels meeting, crossing and overtaking.

A change has also been made in this Chapter, in the provisions dealing with the trial of licensed officers by placing the trial in the first instance before the supervising inspector of the district rather than, as at present, before the local inspectors who, under the present law, bring the charges, prosecute the officer and also act as judges in the case. This present practice is clearly an anomaly in American jurisprudence.

Certain radical changes throughout the Code, which have been generally recommended, such as for instance, in this part of the Bill, the entire or modified repeal of the 50 per cent ad valorem duty on equipment and repairs procured abroad, load-line legislation, bulkhead provisions, increases in the salaries of the inspectors, and placing these officers under the civil service, etc., have been omitted at the suggestion of the Government authorities concerned, as being more properly subjects to be included in separate bills.

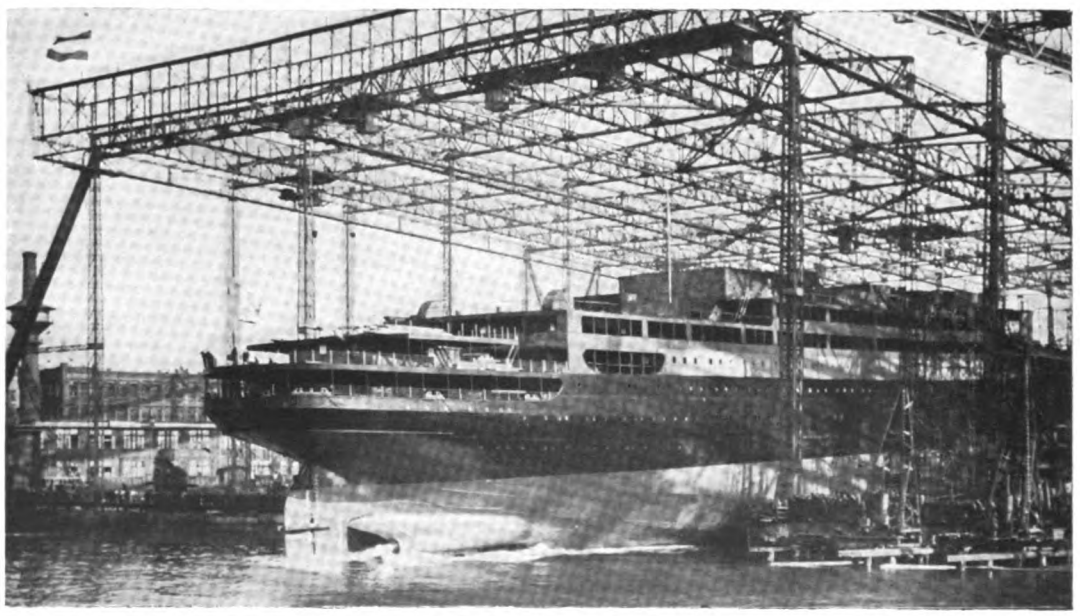
Care has been taken to secure exemption of the Great Lakes Section from many of the general laws to which that commerce is now subject, which by their nature should not apply thereto.

Other Inspection Service matters, dealing with passengers, and the carriage of explosives and inflammables, and the like, will be dealt with in later sections of the Code in the Chapters on such subjects.

Copies of this proposed Amending Bill as they are prepared will, we understand, be sent for comment and criticism and possible correction, to the various Government bureaus interested in the subjects dealt with, and also to the members of the numerous committees that have aided in the preparation of the Code, such as the committees of the American Steamship Owners' Association, the Pacific American Steamship Owners' Association, the National Board of Steam Navigation, the Great Lakes' Association, the Inland Water Lines Association, the Seamans Union, Associations of Masters, Mates and Pilots, and the Committees of the Maritime Law Association, and the maritime committee of various Chambers of Commerce who have shown active interest, including the Chamber of Commerce of the United States.

The second part of this Amending Bill which will contain some sixty sections, will cover Chapters 4 to 9, of the Code, dealing with the laws relating to seamen and to the entry and clearance of vessels, and unloading of merchandise, and will shortly be ready for distribution. Parts III and IV covering the remaining subjects, will follow as soon as possible.

Swedish American Liner Kungsholm Launched



A super Gripsholm building at Kiel for transatlantic service was recently launched

The Editorial Viewpoint

Motorships Still Gaining

WORLD SHIPYARDS, at the present time, are constructing some 88,483 tons more motorships than steamers, according to the latest returns of Lloyds Register of Shipping. This bigger motorship figure is maintained on a declining curve of world shipbuilding figures, because motorship construction has shared in the general decline of the last quarter, the decrease from the total at the beginning of the year reaching 119,000 gross tons. More than 50 per cent of the world construction of all types of ships, however, is being devoted to vessels equipped with internal combustion engines.

Gains, however, are shown in Lloyd's returns for the quarter just ended giving the i.hp. of oil engines building, or being installed throughout the world. This is in the face of a decrease recorded for Great Britain and Ireland, their figures for this type of engine declining from 373,341 i.hp. at the beginning of this year, to 354,451 i.hp. at the end of March. For the other countries combined, however, the total rose in the same period from 860,615 i.hp. to 979,424 i.hp. This increase brings the total for the world to 1,333,875 i.hp. as against 1,233,956 i.hp. at the end of the previous quarter. Of the present total, Germany's share is 225,770 i.hp.; that of Switzerland, where many engines are built, 117,460 i.hp.; while the figure for the United States is 69,329 i.hp.

For steam reciprocating engines, a small decline is shown in the indicated horse power, the world total being 549,910 i.hp., as compared with 556,874 i.hp. in the previous quarter.

A decline is shown also in the returns given by Lloyd's for steam turbines; the s.hp. for all countries aggregating only 277,600 at the close of the quarter just ended, as compared with 343,700 in the previous quarter. These figures do not include Germany, returns from that country not being available.

Pacific Coast Trade

A NEW AND IMPORTANT motorship fleet is rapidly springing into being for trade between the Pacific coast of North America and United Kingdom-Continental ports whose units have an entity all their own.

There is, as a matter of fact, only a dawning recognition of the important part the motorship is going to play in still further opening up the Pacific coast and, in particular, Californian ports for trade to Europe. The possibilities of the trade are enormous and the next few years will witness tremendous competition in trade not only to Europe but also to the Orient.

One of the most important factors in the trade is the convenient location of the world's cheapest oil port—San Pedro, which acts as a large incentive to shipowners to build motorships. Shipowners are now placing much importance upon passenger accommodation. This is in particular a feature of the four new Hamburg-America ships now completing for Pacific coast service which we described in our last issue. An examination of the general arrangement plan of these ships shows that they have been designed very definitely along the lines of passenger ships. They are, in fact, intermediate liners in the full sense of the word. They are the first full intermediate liners for this service. All the previous ships of German and other nationalities have been cargo ships with passenger accommodation—a distinction with quite a big difference.

The Panama Canal

THE PANAMA CANAL, cheap oil at San Pedro, the economy of the motorship, the increasing speed of the latter bred of competition—all these have combined to make a very definite ship type—the "Pacific Coaster" and a feature analysis of the type quite justifies its segregation from other motorship types. The Pacific Coaster has between 3500 and 4000 horsepower and moulded dimensions about 450 ft. by 60 ft. by 40 ft., with a carrying capacity of about 10,000 tons. It differs from other types in that there are two tiers of 'tween decks, the top one being clear of bulkheads and suitable for lumber, the lower one insulated for Californian produce, while the holds themselves have centerline grain divisions. Thus the Pacific coast grain-lumber-fruit cargo is provided for, and the characteristics are such that a general cargo can be carried outwards from Europe.

We haven't reached the final step in evolution for this trade. The next step will unquestionably be 16-knot ships with even bigger passenger accommodation, and a very definite incentive for Pacific coast passengers to travel to Europe by this means. Already some new ships on this run are averaging a good 14 knots with daily runs of 340 and 350 miles.

Montauk Point as a Terminal

MANY PEOPLE in and around New York seem to be taking an entirely too serious view of the proposal to use Montauk Point as a terminal for transatlantic ships. If anything comes of the scheme it is obvious that only the fastest ships, which can literally be numbered on the fingers of two hands, would use such a terminal. And yet with the increasing number of fast motor liners now being constructed for transatlantic service, it is not without interest to view the possibilities of such a move—especially in view of the quick turn around which the motorliner can make.

It is unnecessary to consider that Montauk Point could ever be used for transference of freight. New York is the logical handling place for this. Indeed, the fast ships which would use Montauk Point carry an amount of freight which is comparatively negligible. This, moreover, is generally of highly valuable, delicate, nature and does not come under the same category as the general cargo which the smaller but no less important intermediate passenger cargo liners carry.

As a terminal point for such fast vessels—steamers or motorships—Montauk Point would be useful. It would clip the time to New York considerably and would correspond in very many details with the present arrangement adopted in Great Britain.

A Quick Turn Around

SOUTHAMPTON is the terminal port for the MAJESTIC, LEVIATHAN, AQUITANIA, MAURITANIA, HOMERIC and one or two others of the very largest type. It is about two hours run from London, very little further than Montauk Point is from New York. A negligible quantity of freight is handled in Southampton. In fact, it is almost a 100 per cent passenger port. London and Liverpool may feel that they should get the undivided attention of the big passenger liners, but they know that they cannot and they are therefore quite content to handle vessels like the ADRIATIC, FRANCONIA and ships which carry large quantities of freight and which spend longer time in port at each end than do the big mammoths.

There is an excellent service of boat trains between Southampton and London and you will seldom hear the transatlantic traveler grumble in having to make this journey instead of being able to get the boat actually in London.

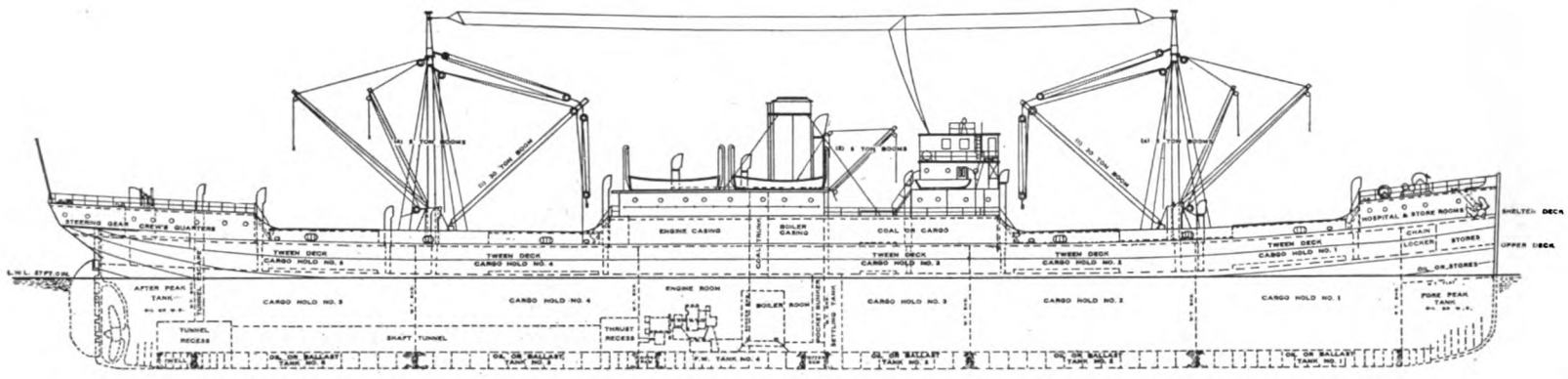
New York has little to fear from this Montauk scheme. At the worst she will lose a few of the larger ships, but even then the chances are that arrangements will be made for them to come on to New York after discharging passengers, in order to discharge what little cargo they have. The bulk of the freight must inevitably always be headed to New York, and for this, as for all other water transportation facilities, New York has unrivaled facilities.

Therefore, in considering this Montauk scheme a balanced view must be maintained as to what is going to happen to New York. Most steamship agents will agree that the bulk of travel today in the rush season is of the cabin and tourist berth class. Ships carrying such people would have no reason for using Montauk Point. It is only the swiftest and fastest De Luxe services that have anything to gain thereby.

Electric Towboat for Warrior Service

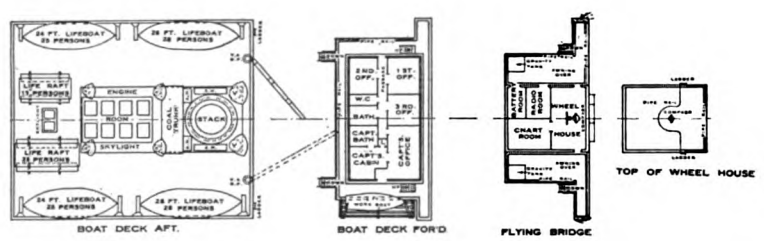
THE TENNESSEE COAL, IRON AND RAILROAD CO. of Birmingham, Ala., is building a twin screw tunnel stern towboat of Diesel electric type for Warrior River service. Nelseco Diesels and General Electric propulsion equipment will give the vessel 400 s.hp. It is significant of the economy of Diesel should have so impressed itself upon a company which is primarily a coal company and which operates a number of steamers.

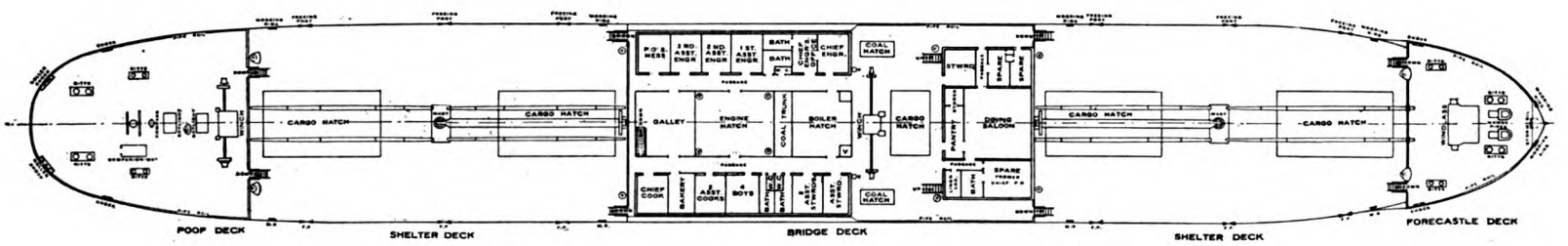
Eight More Shipping Board Freighters to Be Dieselized—the New Orleans Class

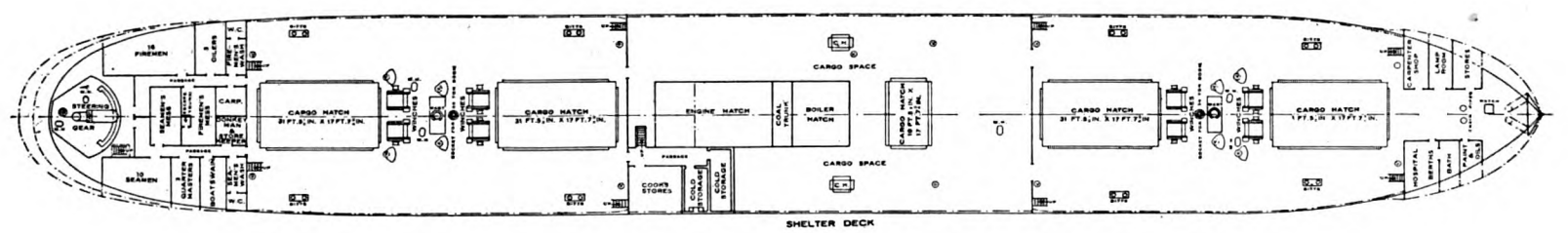


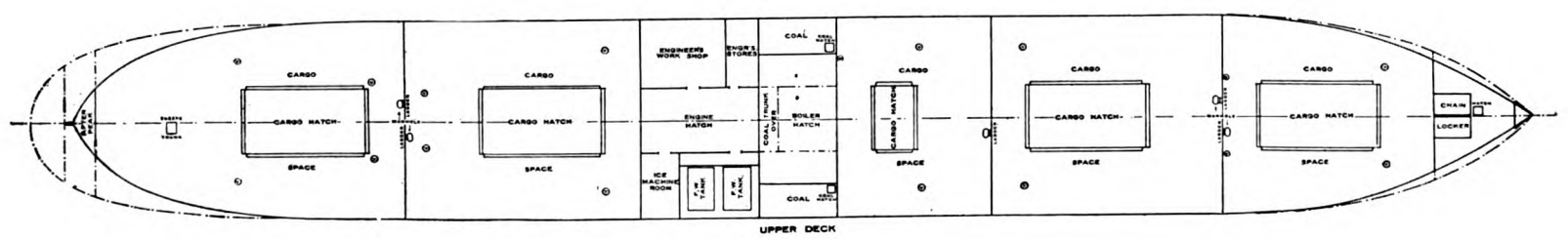
Characteristics of New Orleans Class

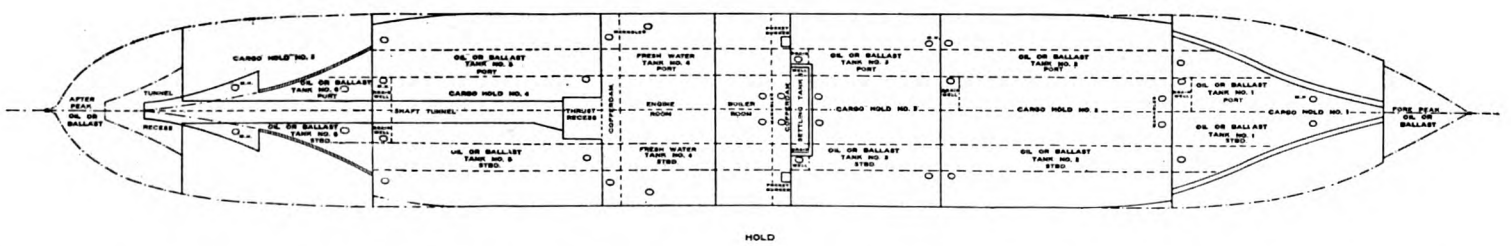
Length o.a.	412.25 ft.
Length b.p.	395.5 ft.
Beam mold.	55.0 ft.
Depth mold.	34.9 ft.
Draft (load)	27.1 ft.
Cargo capac. (grain)	476,120 cu. ft.
Cargo capac. (bale)	452,745 cu. ft.



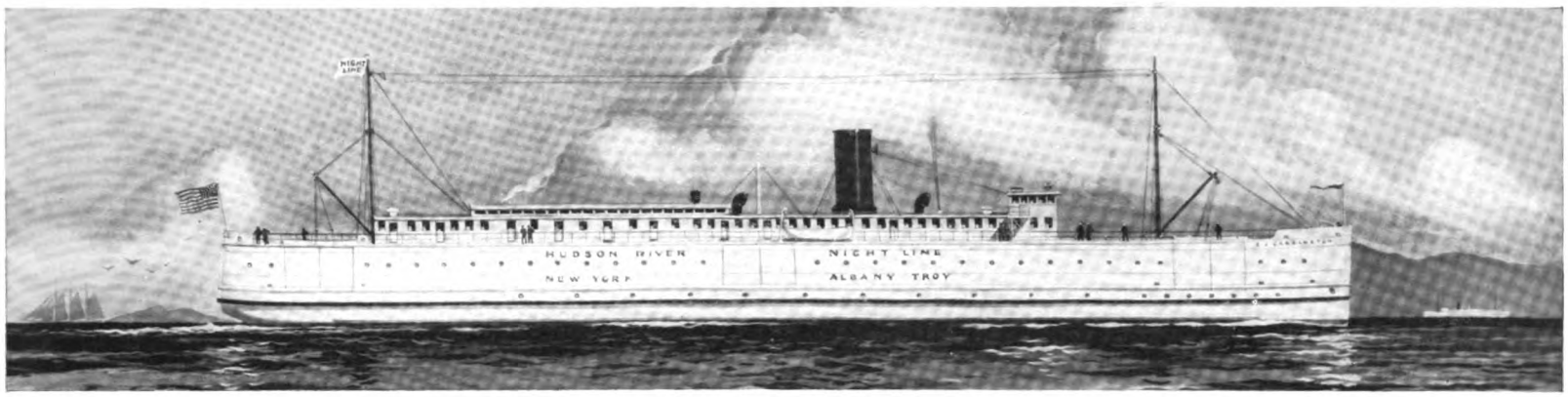








Two Busch-Sulzer, two Hamilton-M.A.N., two Worthington and two McIntosh & Seymour double-acting Diesels are now building for main propulsion purposes on the eight ships of the New Orleans class illustrated (as steamers) above. Nordberg and Fulton are building the auxiliary Diesels. All of the above main engines except the two Busch-Sulzer units will be of double-acting type, the McIntosh & Seymour units having 5 cylinders. The new programme presents, therefore, some interesting aspects. Bids are expected to be asked of shipyards shortly for the installation and conversion work. Quarters will be provided for 16 passengers



Diesel Power for Floating, Mobile, Garages

Hudson River Night Line's Two New River Freight Motorships Are Designed to Carry 300 Automobiles at 16 Knots Speed

By A. C. Hardy, B.Sc.

(Author of "American Ship Types," etc.)

THE plans of the Hudson River Night Line to proceed with the construction of two big automobile carrying ships to operate in their fast New York-Albany service deserve to go on record as marking a definite step in the technique of American ship type construction.

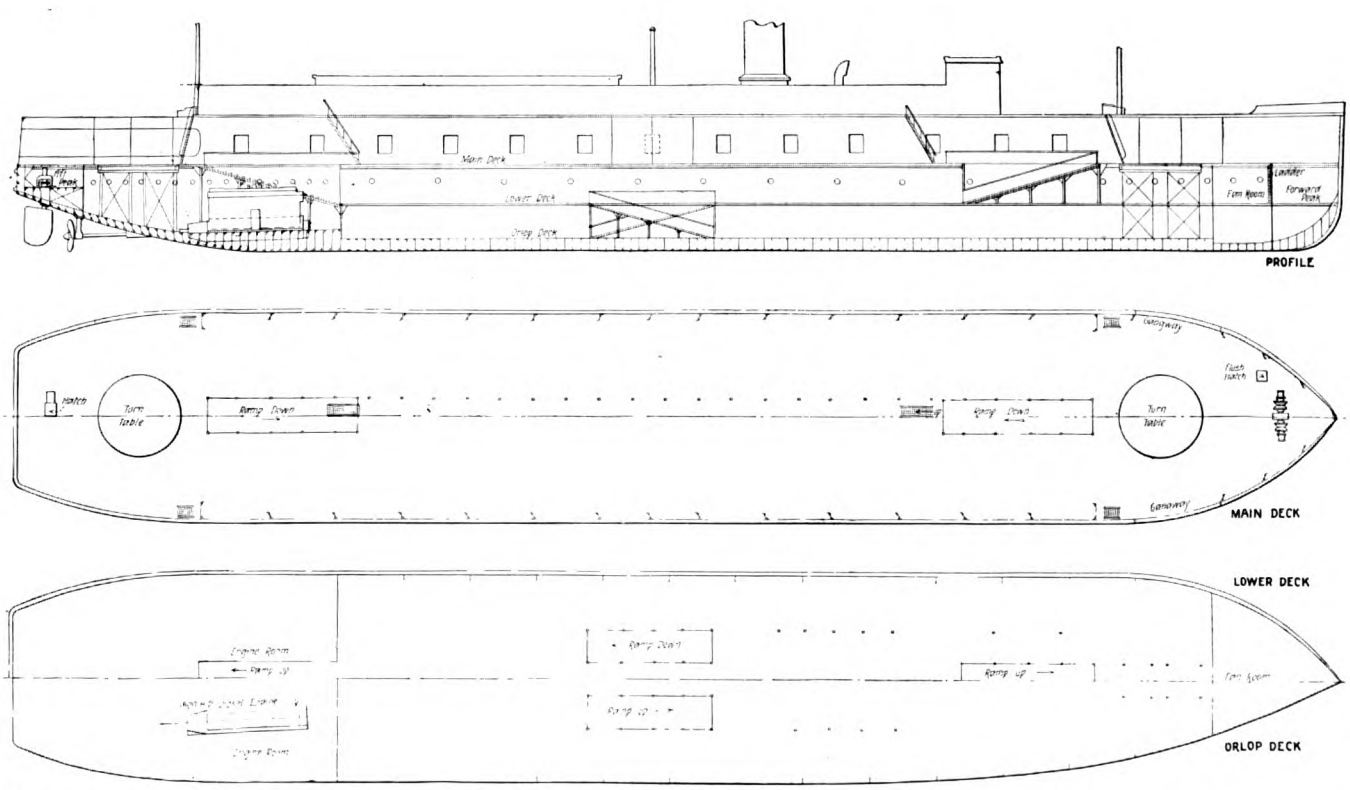
We are forced to this conclusion from whichever angle we view the project, and a glance at the plans and the wash drawing accompanying this article lend strength to the statement. Two 3000 hp. Diesel driven sound type ships are to be built exclusively for the transportation of automobiles and of their drivers up the Hudson River.

The prime reason for their construction is the appalling congestion of roads and boulevards in and around New York especially during the summer season. People can transport their automobiles clear up to Albany and then start on up state—to the Adirondacks—or to the West, traveling overnight in comfort over the most congested part of the route.

The reason for their being Diesel driven ships is obviously one of economy of fuel, elimination of standby losses, absence of time lost in filling up with water and with coal. Last, and very important because of the design of the ships and because they are virtually great floating, mobile, garages, there is the complete absence of boiler uptakes which allows of clear decks. The plans show how well this is accomplished. The Diesel engines will be conveniently arranged aft, as the drawings show. A steam plant could never have been arranged to permit of such clear deck space.

Existing Hudson River craft owned by the Night Line as well as by the Day Line are long comparatively shallow hulls with all passenger accommodation built up above (two or three decks) as light superstructures. Those which are propelled by side or paddle wheels are very beamy because the main strength deck is faired out over the paddle guards.

The existing Hudson River Night Line ships, as I have shown in chapter five of my American Ship Types are virtually a



General arrangement of the new floating garages for Hudson River Night Lines, fast New York-Albany ferry service

cross—in type and characteristics—between sound ships and the Day Line type ships. They resemble very closely the Eastern Ss. Co's. fine ships BOSTON and NEW YORK. The new automobile ships are to be practically in ocean parlance, "full scantling" vessels, and are classed for coastwise service to the West Indies. Their scantlings are sturdy and they have a full double bottom all fore and aft. All automobile loading, very naturally, is carried out through the sides and there are ingenious arrangements of ramps and turntables.

When complete these two ships will be noteworthy and one can most definitely say that their construction embodies one of the most important plans yet concerned to operate large, fast river passenger and freight ships with Diesel power. This step as a matter of fact was decided on by Night Line officials shortly after the line underwent reorganization early this year.

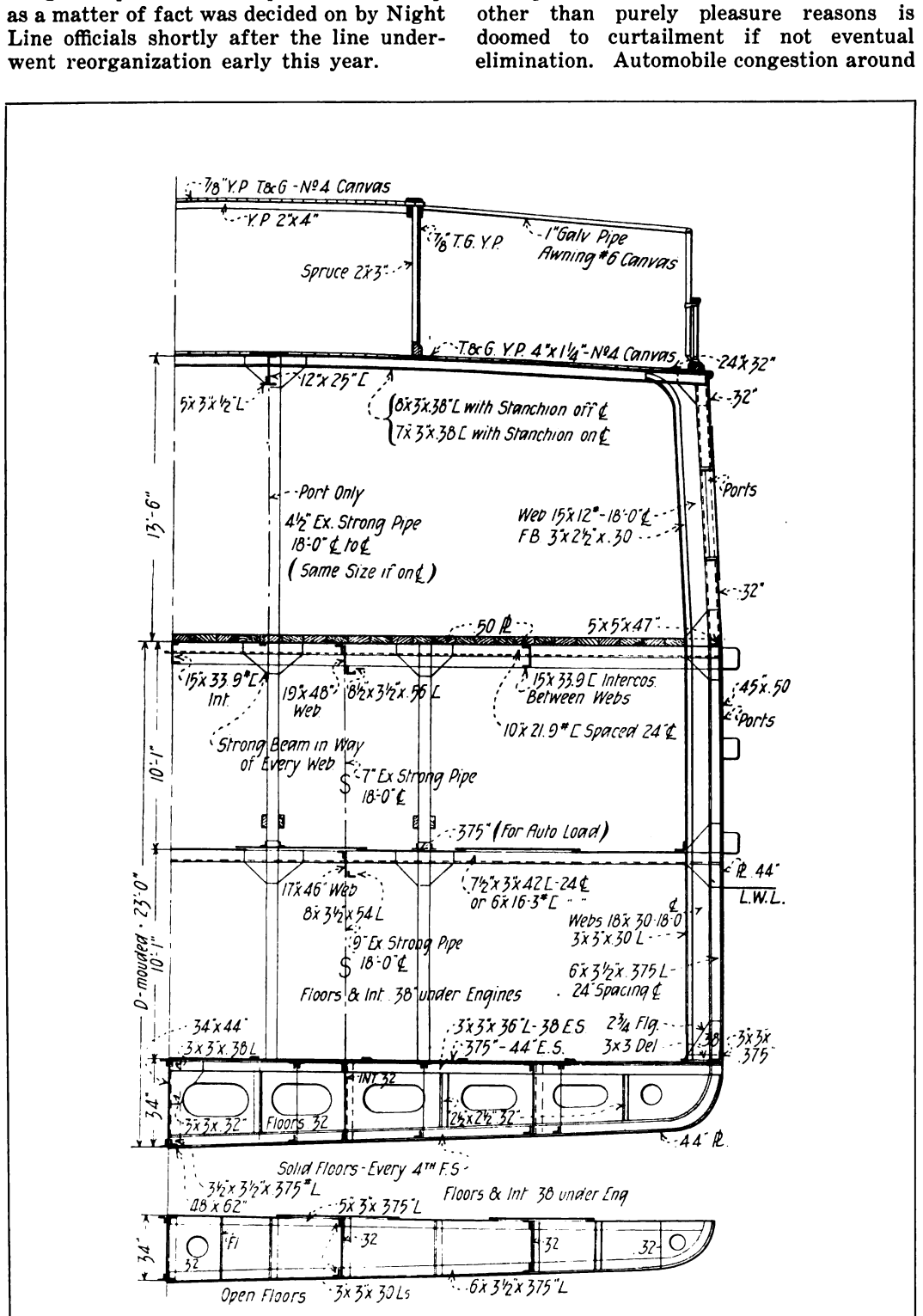
For many years the Hudson River has been a famous river waterway or "riverway' and both tourist and commuting passenger travel has been exceedingly heavy during the season. The steamers owned by the Night Line plying between Albany and Troy and New York City have always been rated as among the finest river ships in the world. Despite the fact that two of the heaviest travelled railroads in the country run along either shore, competition has not decreased travel on the river during the season April-December to any appreciable extent. With the coming of the automobile and the opening up of express highways on both banks, the scene has changed. Motoring is changing tourist and week-end travel and in some ways it is correct to assume that passenger travel on river boats for other than purely pleasure reasons is doomed to curtailment if not eventual elimination. Automobile congestion around the cities is working its own destruction, however.

The Hudson River Night Line decided for this reason to enlarge the cargo space below decks on its existing steamers to carry automobiles as well as passengers, thus making it possible for passengers to enjoy a night's rest in a comfortable stateroom and carry their cars along with them, saving a day's time en route to the vacation and resort country. So successful was this experiment that company officials decided that the best way to meet the competition set up by the auto, was to sell the public the idea of avoiding congested roads by transporting carry cars up the river with less discomfort than they could be driven up by their owners. In this connection, we may remember that in the metropolitan area of New York there are 9,500,000 people,—a great proportion of whom seek vacations and holidays in the mountains of northern New York.

The two new ships—river ships, auto ferries, floating garages or whatever we call them—will be 352 ft. long and have a breadth of 52 ft. and a draft of 12 ft. They will be powered with twin 1500 hp. Diesel engines placed well towards the stern and will be capable of making a 16 knot speed up the river. The ships will have a gross tonnage of 7,380 and a capacity of 300 cars or 200 cars and 90 trucks. The interior arrangements will be unique. No regular passengers will be carried on these boats. Cars will be carried on three decks. The main deck will be of very heavy construction and have a capacity of 100 cars or 90 trucks, extra headroom being provided for the heavier trucks and buses. By an elaborate system of turntables and double ramps cars will be carried down to the two lower decks and loading will be accomplished at either end of the ship. Accommodations for 150 chauffeurs and drivers will be provided free on the upper deck.

With these arrangements these boats will be really long haul river ferries. They will dock alongside the regular passenger boats and owners may drive their cars on board and leave them there at any time during the day of sailing. They will then board the regular boats and at sailing time both ships will leave at either end of the run together. Thus it will be possible for owners of cars to enjoy all the comforts of a regular passenger liner and have their cars ready for them in the morning. This also permits both boats to be of shallow draft for easy navigation of the upper river and keeps the cars and freight separate from the passengers.

The company also plans to construct a fleet of fast Diesel powered commuting boats for use along the river and eventually plans the Dieselization of its entire fleet. The Hudson River Night Line at present operates four large river passenger steamers, the FORT ORANGE, the RENSSLAER, the BERKSHIRE and the TROJAN, all big side wheelers.



Midship section of the New Hudson River Night Line's ferries. The vessels can be used also in coastwise service

New Maxim Silencer

Maxim Silencer Co., Hartford, Conn., announce production of a new design of silencer. This is of entirely modified type and will be both lighter in weight and smaller in diameter.

Ms.—Wilscox Latest Shipping Board Conversion

Powered by the Big New London-M. A. N. Double-Acting 2-Cycle Diesel. This Ship Is Now Operating in S. American Trade

WITH the completion of work on the Shipping Board motorship WILSCOX, the first batch of twelve ships slated for conversion to Diesel power have been modernized. Like the previous three vessels of the same group, passenger accommodations on the WILSCOX have been eliminated, but her other arrangements are practically standard with the complete batch of conversions. MS. WILSCOX made her trial run off Boston harbor on April 18 and met every requirement of the Board. She is powered by a double acting 2-cycle Diesel specially constructed by the New London Ship & Engine Co., Groton, Conn.

The hull of the WILSCOX is practically a duplicate of the recently converted ships SEMINOLE, TAMPA and UNICOI, having an overall length of 416 ft., a beam of 54 ft. and moulded depth of 33 ft. 9 in. She has a normal load draft of 26 ft. 10¾ in. and a cargo capacity of 9235 tons. She has a total cargo capacity of 447,800 cubic feet and a normal sea speed of about twelve knots. Her deep tanks have a capacity of 1051 tons of salt water and she carries 760 tons of oil fuel.

The WILSCOX is now on berth at New York for Santos and Rio Grande du Sul, sailing on May 10 in the American Republics Line service. This service now has, including the WILSCOX, two motorships, the other being the WEST GRAMA which has just completed her maiden voyage.

Reconstruction work was carried out by the Bethlehem Sb. Corp., Quincy, Mass., in a highly satisfactory manner, and her engines were built by the New London Ship and Engine Co., Groton, Conn. Following is a table of costs incident to changing her over from steam to a Diesel powered ship:

Cost of Rebuilding Freighter Wilscox

Installation and special alterations..	$413,000
Main engine, including spares.....	253,500
Deck machinery, including steering gear, motors, control and cable...	28,900
Engine room auxiliaries, including engines, generators, pumps, coolers, switchboard, cable.....	95,000
Equipment and outfit.....	25,000
Engineering, purchasing, inspection, traveling, freight, extras, trial trip and incidentals	38,000
	$853,400

The WILSCOX is powered by a 4-cylinder, 2-cycle double-acting New London-M.A.N. Diesel engine of air injection type. The cylinders have a stroke of 47.24 in. and a bore of 27.55 and a piston speed of 905 ft. per min. The engine develops 3680 hp. at a speed of 115 r.p.m. The engine has one fuel nozzle at the top of the cylinder and two at the bottom, and piston-cooling is accomplished with fresh water and the cylinder jacket salt water. Two air starting and maneuvering tanks with a capacity of 500 cu. ft. are arranged in wings of the engine room.

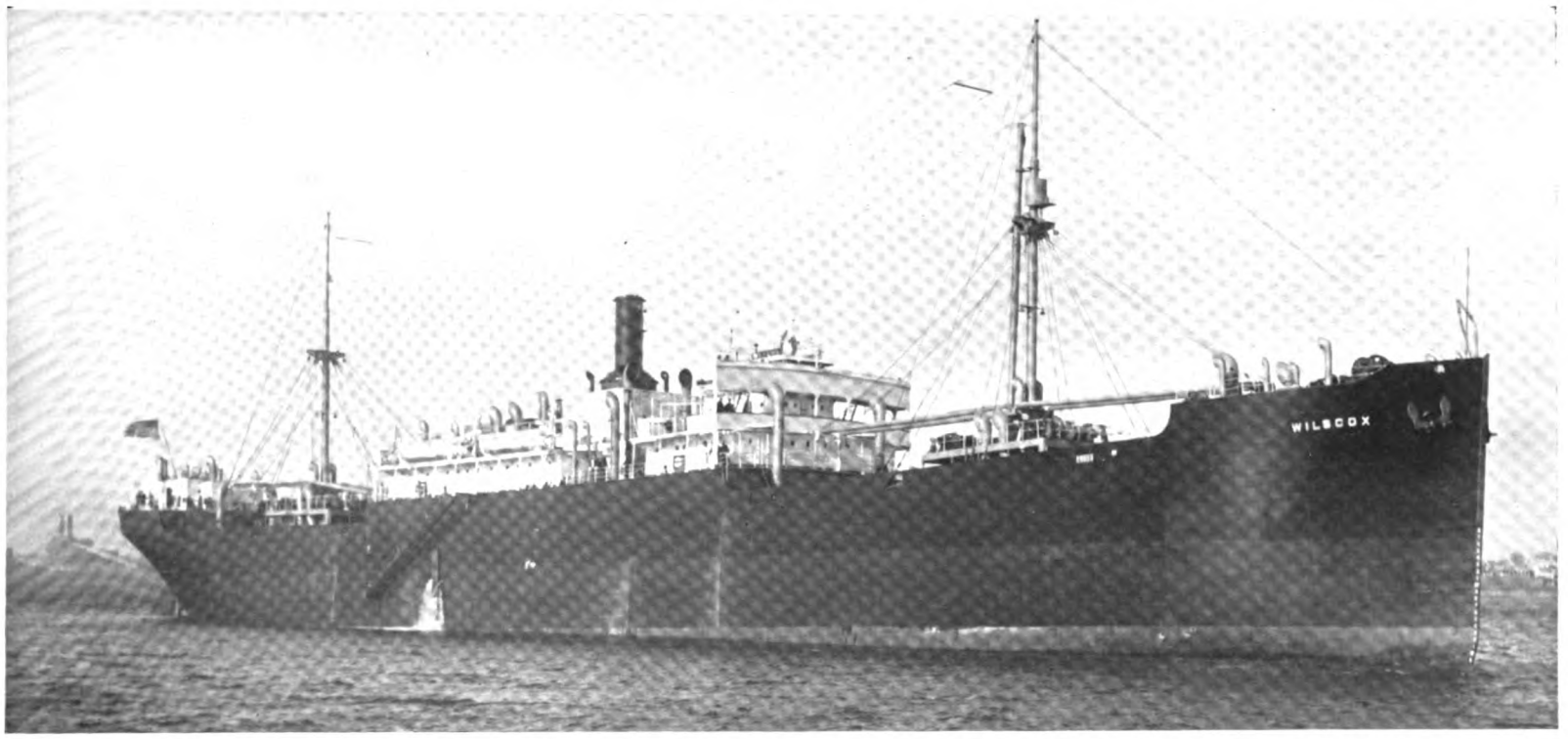
Three Worthington Diesel engines supply her auxiliary power sets. These engines are of the three cylinder single-acting, 2-cycle air-injection type and develop 115 hp. each at 265 r.p.m. Each set drives a 75 Kw. 240 volt Ridgway generator. An emergency lighting and compressor set driven by a 3 cylinder 22 hp. Mianus engine of the single-acting, 2-cycle, airless injection type is also provided. This drives a 14 Kw. generator and a Rix compressor.

Her pumping equipment is elaborate and well designed and motor driven. A salt water cooling pump of 750 g.p.m. capacity driven by a 30 hp. G.E. motor provides cooling water for the main engine jackets. A general service pump of 750 g.p.m. capacity; a 200 g.p.m. fire pump driven by a 30 hp. G.E. motor; a 300 g.p.m. centrifugal pump for engine room bilge; a fresh water pump of 70 g.p.m. capacity driven by a 7½ hp. motor and a sanitary pump of 70 g.p.m. capacity in addition to a fresh water piston cooling pump of 200 g.p.m. capacity make up her pumping equipment. All pumps were manufactured by the Nash Engineering Company. The Kinney Manufacturing Company furnished a 2-rotary plunger, 150 g.p.m. lubricating oil pump and a 1-rotary plunger 250 g.p.m. fuel oil transfer pump.

Included in the ship's auxiliaries is a vertical heating boiler of 175 sq. ft. heating surface and 110 lb. working pressure fired by a Todd Oil Burner.

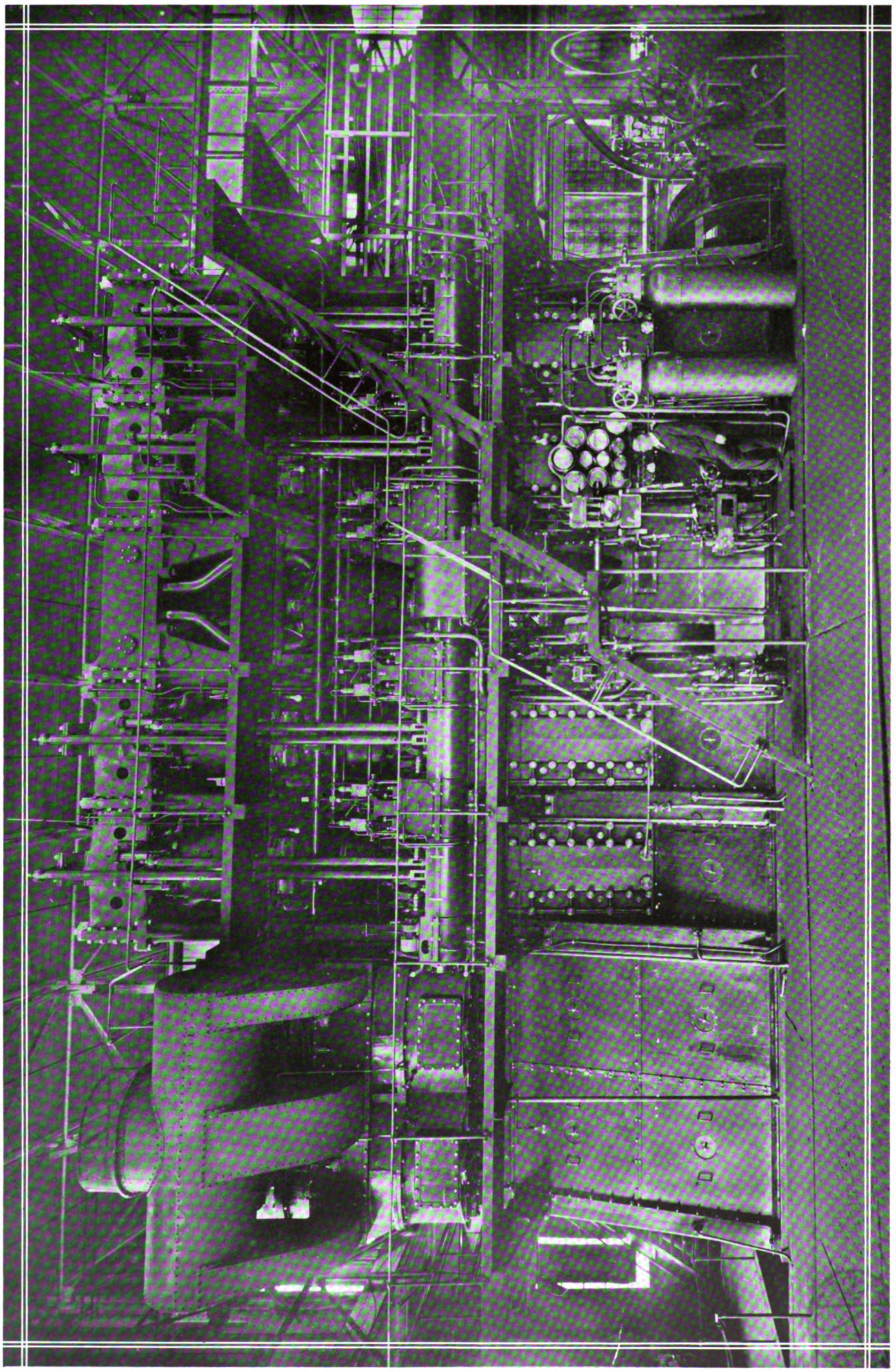
The steering gear equipment is of the Sperry telemotor type with Westinghouse control and "Metal Mike" steering equipment. The winches—ten in number—are the products of the Lidgerwood Mfg. Co., and are of the full electric type. Each is driven by a 45 hp. Westinghouse motor, and is equipped with a Cutler-Hammer brake. The motors are fully enclosed with heavy cast iron plates and control is effected through a single, double throw lever placed on a tripod.

The ship is equipped with a Walter Kidde CO_2 Lux system of fire detecting and extinguishing system and portable extinguishers scattered throughout the ship. As in the other converted ships of this class,



Ms. Wilscox, last of the first batch of U. S. Shipping Board conversions, powered by a New London-M. A. N. Diesel takes her maiden sailing from New York on May 10

The Main 3680 B.hp. New London—M. A. N. Diesel of the U. S. Shipping Board Freighter Wilscox



This engine has four cylinders each 27.55 in. diameter and 47.24 in. stroke. The rated power is developed at 115 r.p.m. and the piston speed is 905 ft. per min.

the WILSCOX has her fire detecting system centralized in the pilot house.

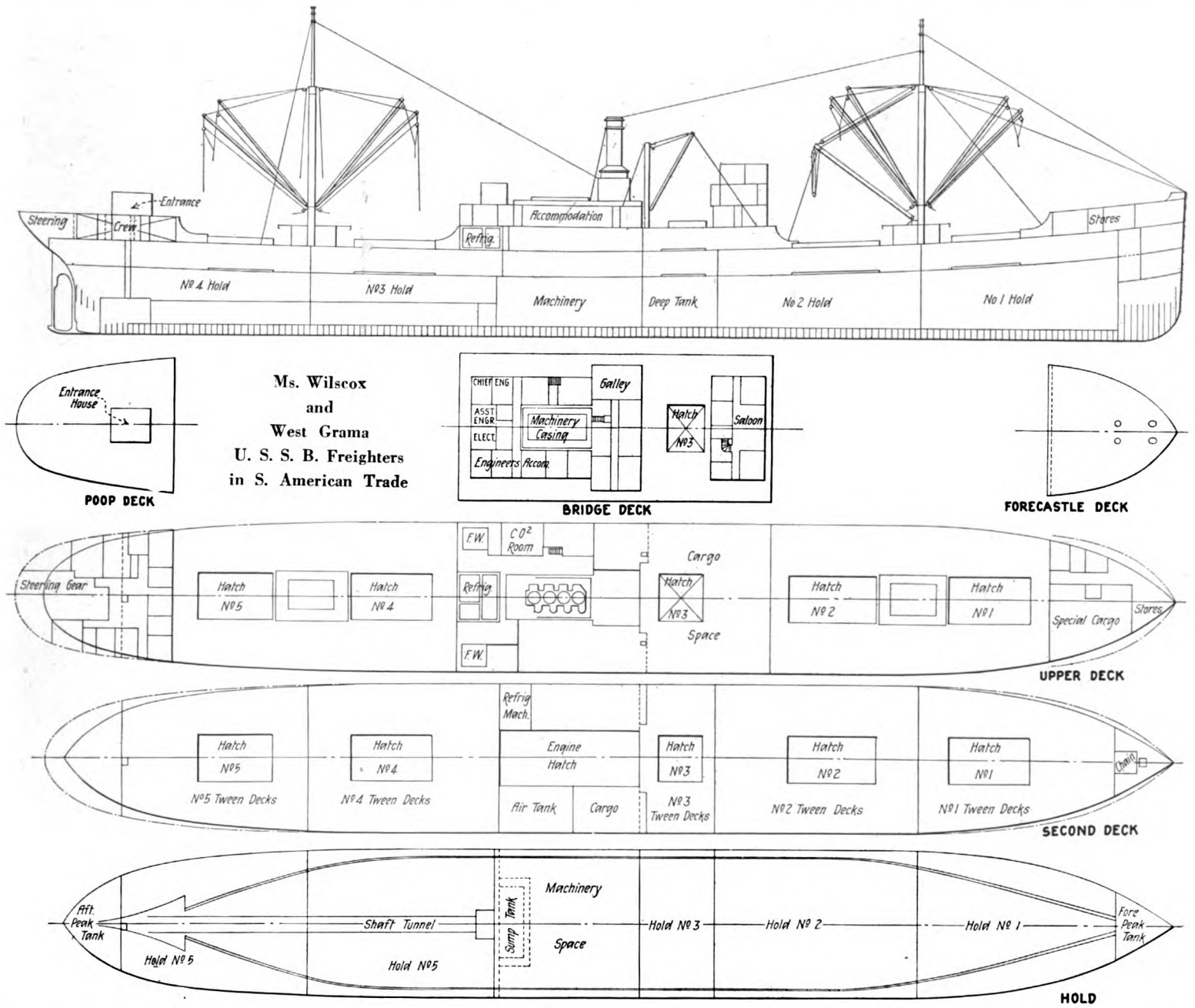
A 1 Kw. spark and 2 Kw. arc radio transmission set, a Sperry visible whistle and three Sharples oil separators complete the principal units of equipment. Many of the auxiliaries were designed especially for the Diesel Conversion Program and have never been installed aboard ship before.

The general arrangement of machinery provides a generous space throughout the engine room and ample provision has been made to carry out routine repairs, both to the main engine and auxiliary machinery.

The main engine is impressive. It is a worthy tribute to the careful manner in which its builders have devoted themselves to its production. It has been finished with exceptional care, and although external appearance does not guarantee an equivalent of quality throughout, it is reasonable to expect a similar high grade of workmanship and material in parts which are not exposed to view.

This engine is one of a long list of large M.A.N. 2-cycle double-acting air injection engines now in use, prominent examples of which are the four 7000 s.hp. engines of the motorship AUGUSTUS.

Of recent years American ship operators have come to realize that profits lie in keeping their ships at sea. Electrical deck machinery is helpful in this respect. In addition to the reduced cost of handling cargo, which results, in a natural way, from lower fuel consumption the rapid handling of cargo reduces the time in part thereby preventing an accumulation of fixed charges, not the least important of which are capital costs. Evidence of the truth of this statement may be found by comparing freight rates as quoted on short and long hauls, in which the number of sea miles plays a less important part than the number



The customary Shipping Board procedure, in making conversions of this kind, has been followed in the retention of the existing machine shop, which works into the new arrangement very nicely.

The entire installation is clean-cut and neat, the details of which have received special attention from both an engineering and mechanical standpoint. Advantages accruing from attention to details of this kind are important, for they relieve the operating personnel of a number of minor responsibilities, at times when their full attention should be devoted to more weighty matters.

The successful production of a Diesel of this power adds one more laurel to an already impressive list of large engines built in America and while the engine is a credit to the New London Ship and Engine Company they are in turn equally worthy as a leading representation of the industry in this country.

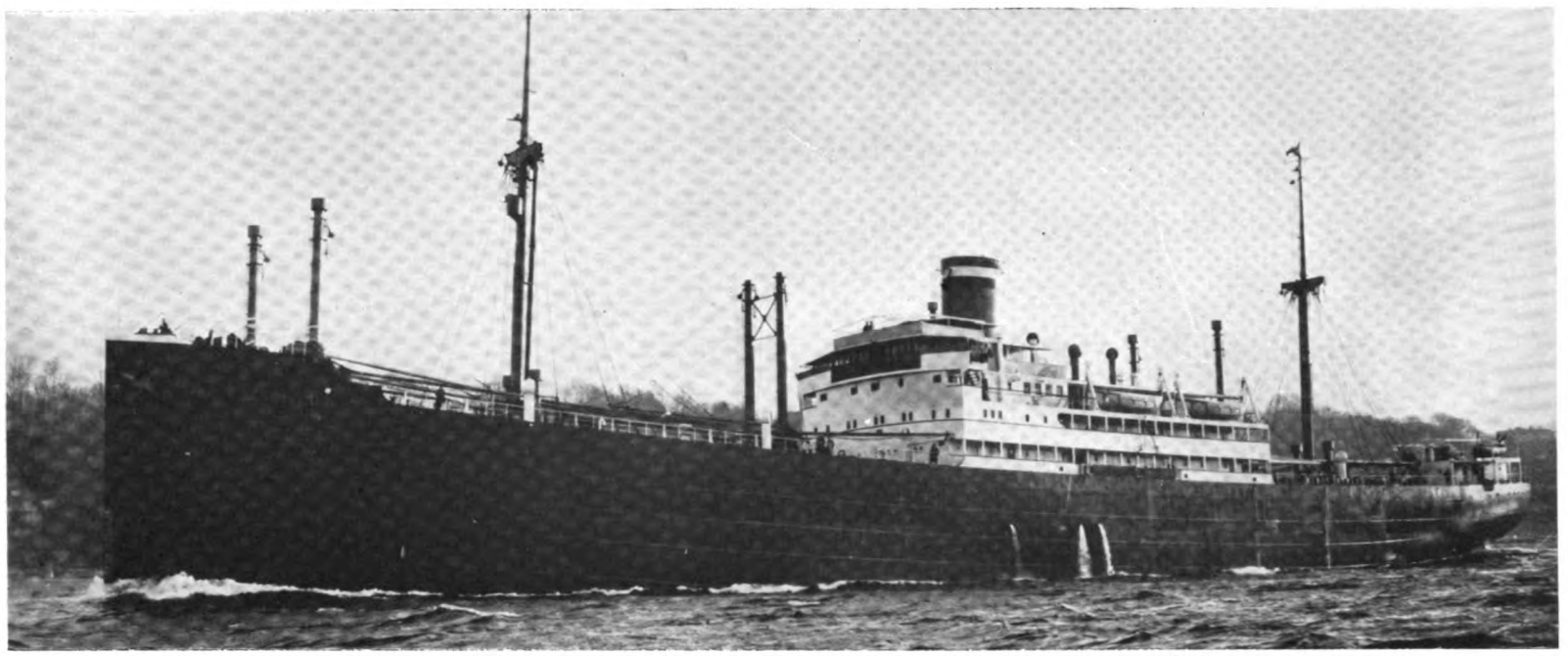
With the new electrical deck machinery the WILSCOX may be expected to give a good account of herself in the South American trade. Not the least important feature of these conversions has been the modernizing of deck machinery, which provides a practical means of making quick despatch.

of times, a ship comes to port. The percentages of total time spent at sea and in port, are influential in determining such rates.

With the present machinery installation the WILSCOX should not be delayed in port. Routine work on the auxiliary machinery may be carried out at sea in preparation for activities in port and there is no reason to suppose that even the quickest turn-arounds will prevent the engineers from giving the four cylinders of the main propelling units their full share of attention.

Features of her machinery installation are similar to other similar installations.

Transatlantic Luxury on Pacific Coast Freighters



First class stateroom

Ms. San Francisco
Hamburg American Line's New Pacific Coaster

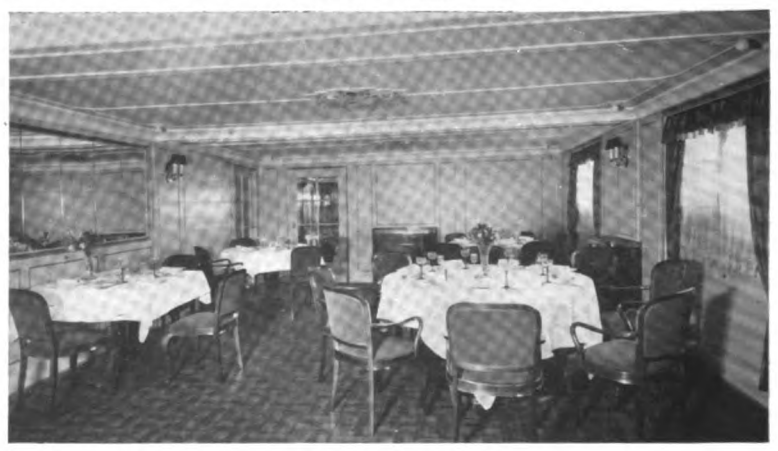
(Described in Last Month's Motorship)

Third class stateroom

Third class smoking room

First class lounge for ladies

Third class dining saloon



First class dining saloon

Fishing Industry Offers Increasing Market for Diesels

Three Large Trawlers Just Ordered for Boston Firm Fitted with Oil Engine Drive

PLACING of an order for three steel Diesel propelled fishing trawlers for Boston parties, is noteworthy from the fact that it reflects the unusual development taking place in the fishing industry in New England. While trawling by steel and wooden steam and motor vessels is not new in America, having started with the trawler SPRAY in 1906, yet it is almost 10 years since large steel trawlers of the North Sea type have been built for American owners. Experiments with the Diesel engine in trawlers have proven their value as compared with steam, not only in its economy as regards crew, but also in the wider cruising range and extra space it allows for ice and fish.

At the present time there are about sixty first class deep-sea trawlers operating out of American ports. If the fishing continues to develop, as it has been doing, there is every reason to believe that the fleet will double within a few years. New craft, and replacements of old vessels will probably be diesel-driven.

Designed along the lines of well-known North Sea trawlers, the three vessels ordered from the Bath Iron Works, Bath, Me., will each be powered by a Diesel engine of 360 s.hp. at 250 r.p.m. direct coupled to the propeller shaft. They will have the following dimensions:

Loaded displacement	360 tons
Fish and ice capacity	135 tons
Power	360 s.hp.
Length	123 ft.
Breadth	23 ft.
Depth	13 ft.
Crew accommodation	20 men
Engineroom length	32 ft.
Fish hold length	35 ft.

We have had the pleasure of discussing these boats with Mr. Edmund L. Dunn, President of the New England Fish Exchange, who is a member of the firm of the Atlantic & Pacific Fish Company, Boston; Francis J. O'Hara being the other member. Their decision to build these boats was partly formed by their experience with the operation of the Nelseco powered Diesel trawler FABIA, they being stockholders in the owning company. Contracts for the hull construction and machinery installation has been placed with the Bath Iron Works in Maine.

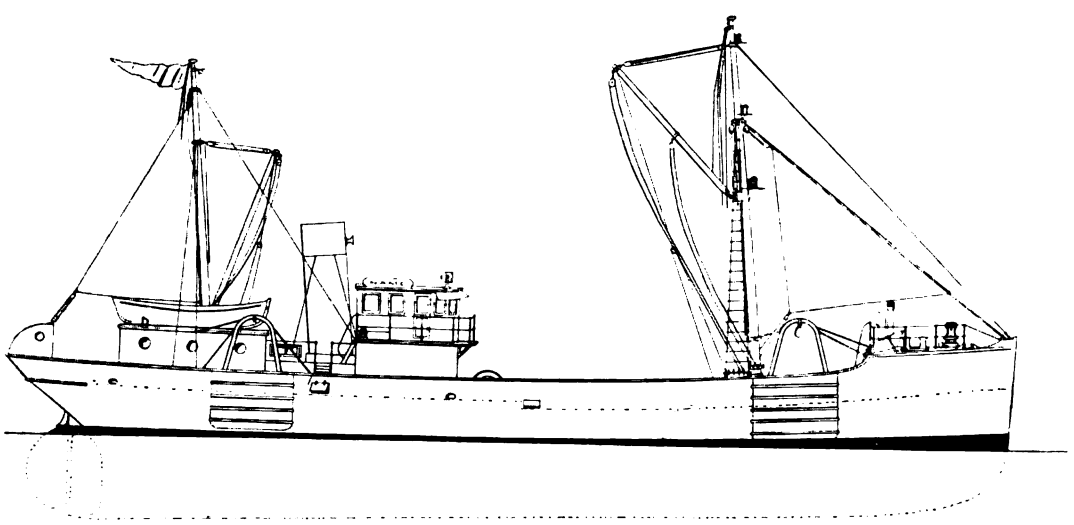
In line with the idea that maximum efficiency from employees obtains only when comfort and convenience of the workers are considered, this firm has arranged comfortable quarters for the crew in the layout of the new vessels. Each boat is to be equipped with wireless, which has been found to be a dividend-paying investment. It is pointed out that boats may be unsuccessful in finding fish in sufficient quantity and that a trawler in a different place having better luck can radio to sister ships her location. Likewise, the officials on shore can notify the vessels of market conditions, so that they can run into port with their catch of fish when it is particularly needed, or stay out longer to obtain more fish.

It has not yet been decided what make of Diesel engine will be installed, but very close consideration has been given to Fairbanks Morse and Nelseco Diesel engines, the same being of the 2-cycle and 4-cycle types respectively. The exhaust of the engines will be muffled by Maxim silencers.

In addition to the main engine for each boat there will be a 110 b.hp., 80 kw. Diesel-electric auxiliary set turning at 500 r.p.m. for furnishing power for the pumps and lighting. Generators and motors will be furnished by the Diehl Manufacturing Co. of Elizabeth, N. J. There will be one 20 kw. Fairbanks Morse Diesel-electric auxiliary set for furnishing power for the starting air compressor. For emergency purposes there will be a 1½ kw. gasolene driven generator set. On deck there will be a motor driven trawl winch either of Hyde or Mead-Morris design. The hoisting winch for lifting fish from the hold will be a 6 hp. gasolene driven set, it being the owner's opinion that it is cheaper to install two or three of these sets each year than to have electricity applied for this purpose. The trawling equipment will be furnished by the New England Structural Products Company of Everett, Mass.

Between the engineroom and the fish hold there will be a cross bunker for fuel oil, while forward of the fish hold there will be a compartment for ballast work. This will also be used to carry fuel oil for consumption while the vessel is operating at sea. A small donkey boiler for heating will be installed, but all the pumps in the engineroom will be electrically driven. Three round trips to the fishing grounds will be made every two weeks. The names chosen for the vessels will be BOSTON COLLEGE, HOLY CROSS and GEORGETOWN.

Indicative of the interest which the fishing industry is now showing in Diesel engines it is of import to announce that Cox & Stevens have called bids for a 143-ft. Diesel trawler of 600 s.hp.



Three Diesel Powered Trawlers of This Type Will Shortly Join the Grand Banks Fleet

Why Trawlers Use Diesel Power

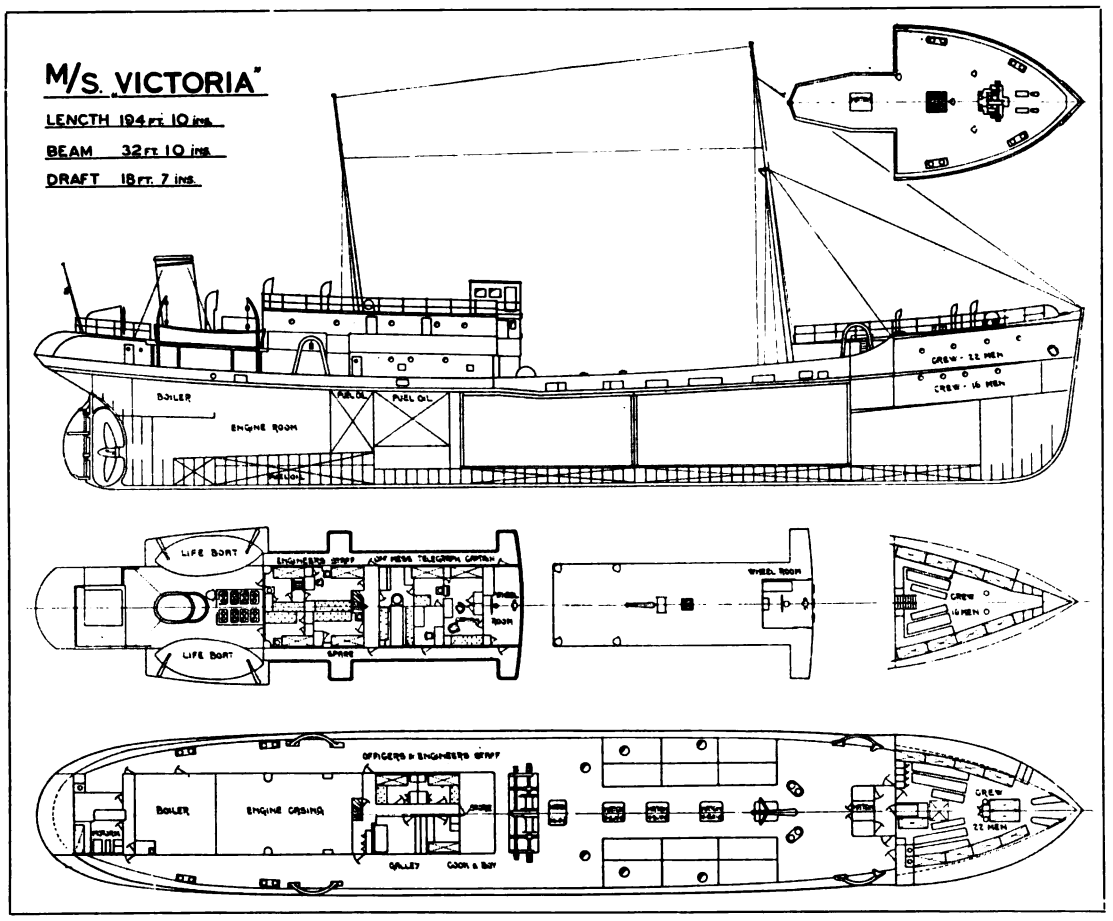
New British and French Vessels Have Characteristics Which Upset All Existing Arguments as to Unsuitability of Oil Engines

ONE of the most recent ship types to adopt the Diesel engine is the fishing trawler. Because of the peculiar situations which are encountered in her operation, steam power plant has for a long while been considered the logical power. First and most important, propulsion power excepted of course, is the operation of her trawl winch. Great and widely varying loads are thrown on the winch. For these reasons a direct connected steam unit was considered the only suitable power. Two Diesel applications have recently appeared which seem to be changing the old ideas of trawler operation considerably.

The British Motor Trawler LILIAS was recently rebuilt and converted to a Diesel powered craft. She is 115 ft. in length and 22 ft. beam and is powered with a Bolinder engine. The engine is rated at 350 b.hp. and has a bore and stroke of 16¼ in. and 18 15/16 in. respectively. It is of the surface ignition type, starting effected by heating a fluted bulb in the cylinder head with a blow torch.

The engine is equipped with a clutch for disengaging the drive shaft and a clutch and set of gears for driving the trawling winch on the deck above. It is interesting to observe that with this arrangement it is possible to apply the full 350 horsepower on the winch, a feat never before accomplished with the old type of gear. This arrangement gives an added advantage to the trawler over the old steam driven boat as well as all of the economies of Diesel operation and the added space available for the catch. The control levers are arranged on deck, like the three speed transmission control of an automobile, which thus gives the proper speed and pulling power to meet varying conditions. In addition to the gear control for use in connection with this engine, the usual trawling winch control mechanism, which includes a pair of brakes, a reversing gear and a lever for holding the winch still. A 10 hp. single cylinder engine with an air compressor drives a plunger type pump, and an engine of the same type drives a generator for lights.

The other vessel of this type which is also capable of making old timers in the fishing industry wake up and look is the new single-screw motor trawler VICTORIA, built and powered by Burmeister and Wain, Ltd., Copenhagen, for the New French Fish Co., of Arachon, France. She is 208 ft. 6 in. in length, and has a breadth of 32 ft. 10 in. and a loaded draft of 18 ft. 7 in., and has a cargo capacity for fish of about 32,500 cu. ft. She is divided into nine compartments by eight athwartship bulkheads. The lower half of the aft peak tank is arranged to carry water ballast and the upper part fish oil. She has fuel oil capacity for 300 tons which gives her an enormous cruising radius of 25,000 miles at her rated speed of 11¼ knots under normal conditions, a feat possible only with her compact type of power. Accommodations on this trawler are unusually luxurious for this type of craft and every precaution is taken to prevent oil or engine odors from contamination. Equipment is complete from electric kneading troughs for the cook to oil fired galley stoves and roomy deck space throughout her entire length. A fish oil refinery of the latest type is installed on the aft port side. All deck machinery and steering gear, is steam driven, power being provided by an exhaust gas boiler with auxiliary oil burning equipment for use when heavy demands are made on the steam supply during a catch. An electric sounder is provided which is declared to be the best deep sea sounder ever installed on a trawler.



The big Diesel trawler Victoria is showing to the fishing industry the economy possible in the new type of drive

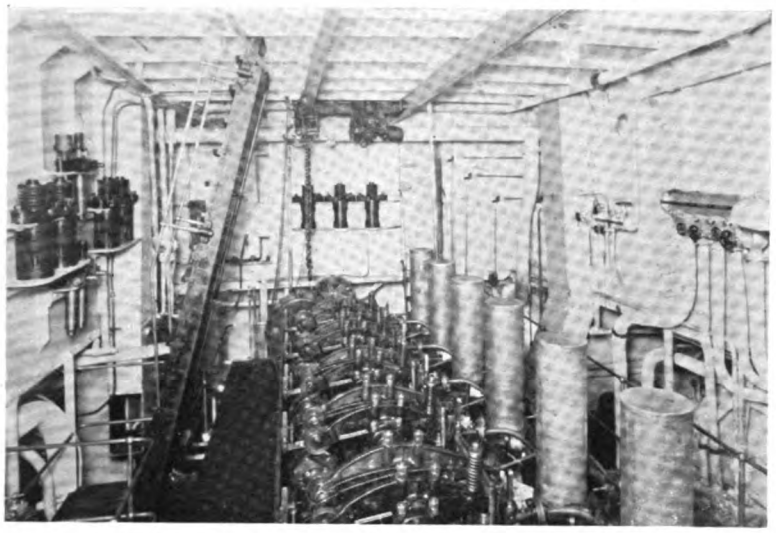
She is propelled by a 6-cylinder, single acting B. & W. Diesel engine of the trunk piston type which develops about 1,000 hp. at 150 r.p.m. All auxiliary machinery is driven directly off the engine crankshaft. An exhaust gas boiler gives unusual economy of operation and provides steam enough for the dynamos as well as the steering gear. There are two generators installed. One a 12 kw. unit driven by a Diesel engine and an 8 kw. steam driven unit is also provided.

Though constructed and operated under entirely different conditions and by different countries, both of these new trawlers will operate mainly in the Newfoundland banks, and are both pioneers in the application of Diesel power to vessels of their class.

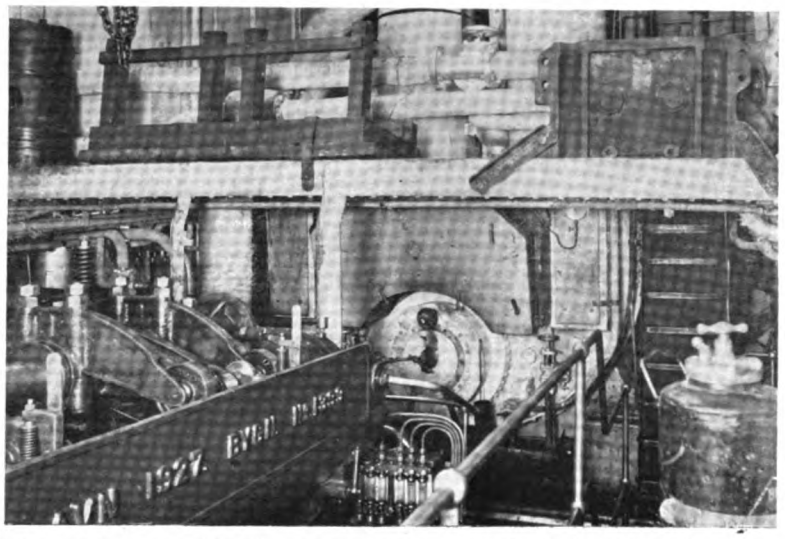
The LILIAS is Great Britain's largest motor trawler, and is the first to apply the full main engine power to the trawling gear. The clutch arrangement permits gradual disengagement as it is of the metal disk friction type, hence with the three speed gearing arrangement, connected with the engine through epicyclic gears practically the same operation as with the old steam type is possible.

Since the LILIAS has been converted from a steam driven coal burning ship, she has the spacing and room of a much larger boat and has storage space large enough for 2,000 boxes of fish. The LILIAS has a gross tonnage of 350 and the VICTORIA 1,075. These are two remarkably built ships for trying out Diesel power in place of the time honored coal burning steam trawlers. Electric flood lights are fitted on the VICTORIA for making night catches, while on the LILIAS the hot water

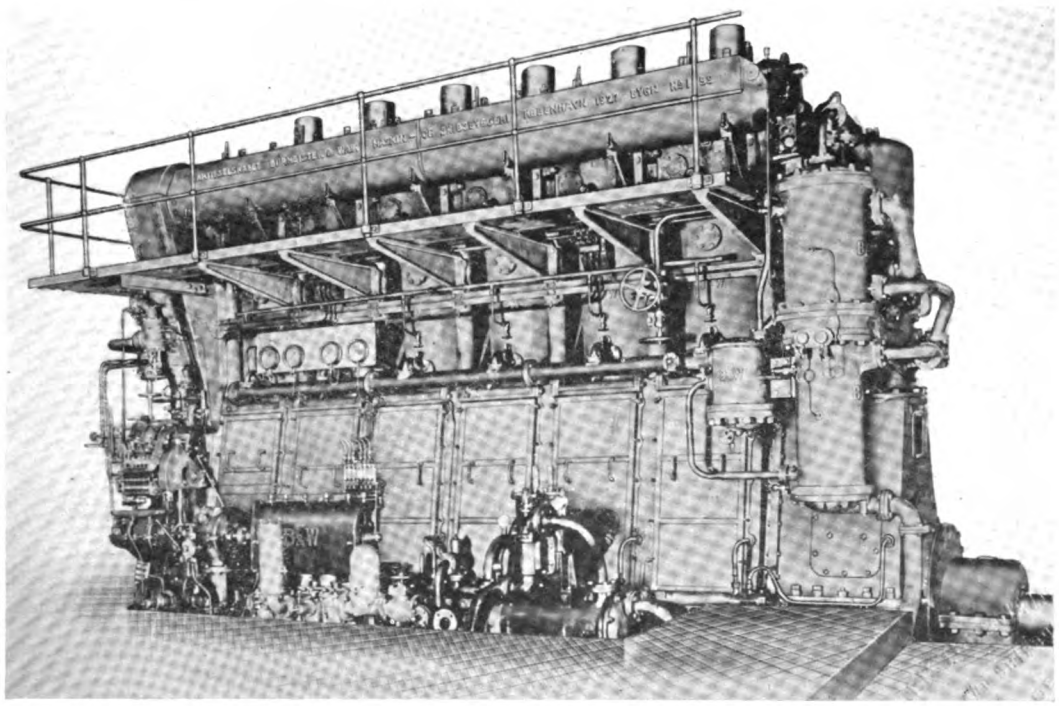
A Noteworthy Motor Trawler Now in Service



Cylinder tops and engine casing looking forward

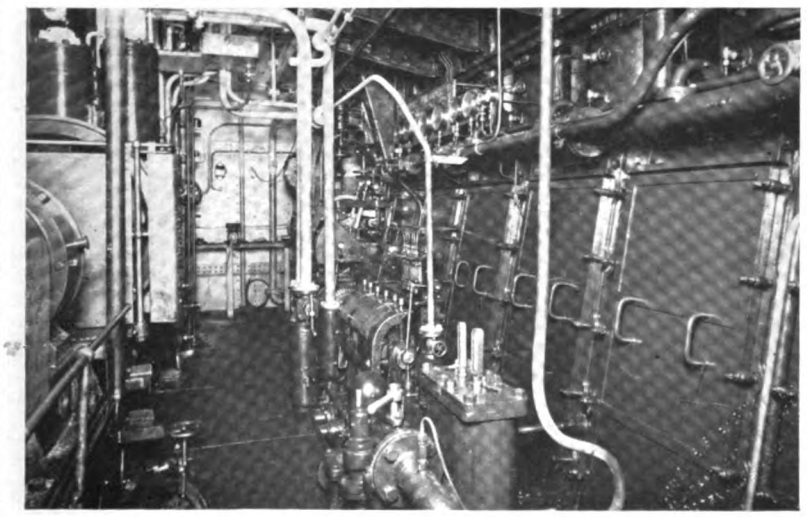


An auxiliary heating boiler mounted on a flat aft in the engine room

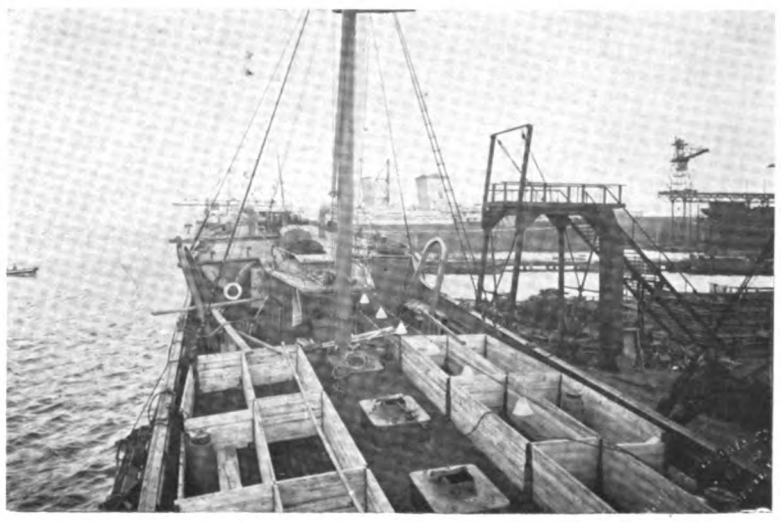


The main 4-cycle trunk piston B. & W. Diesel developing 1000 hp. at 150 r.p.m. is a self-contained unit

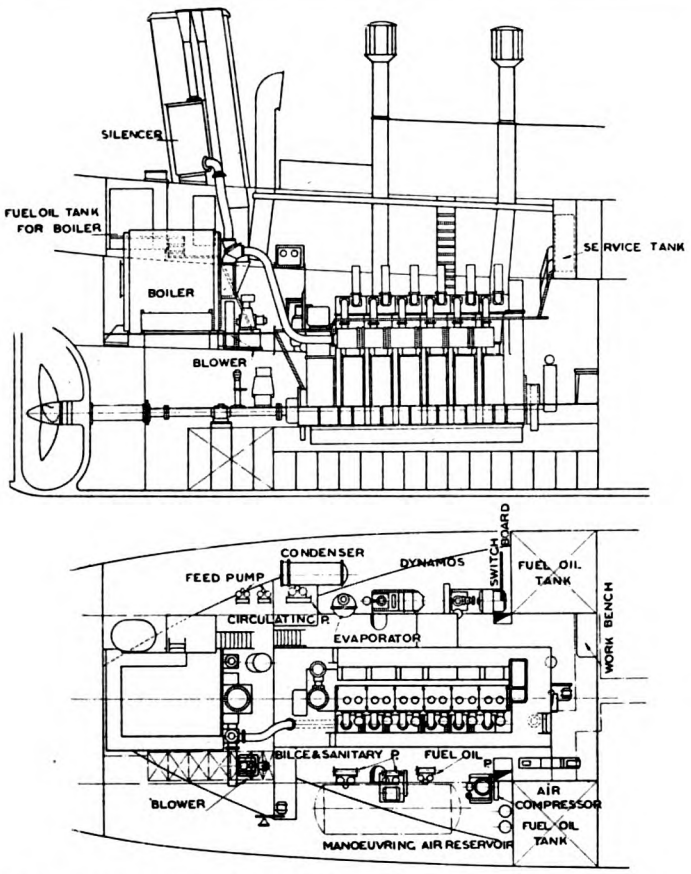
The Motor Trawler Victoria One of the Largest Vessels in the Fishing Industry 2500 Miles on 300 Tons of Fuel

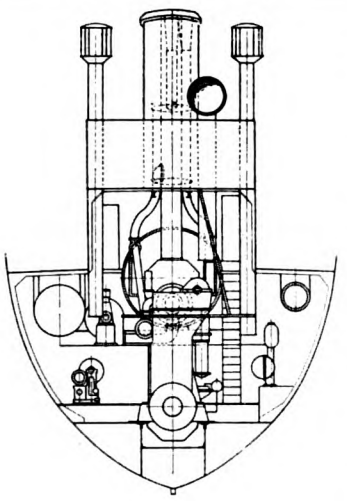


The machinery space isn't crowded although it carries 1000 hp.



Fish ponds on the deck forward of the bridge





Machinery Space Layout Motor Trawler Victoria 1000 Hp. at 150 r.p.m.

from the engine jackets is piped up on deck for thawing the nets. This displaces the steam thawing apparatus, the salt water being much better suited for this than steam, on account of its much lower freezing temperature. The LILIAS has a fuel capacity of only 53 tons yet with her cruising speed of 9¾ knots she has a radius of action of somewhere between 11,000 and 12,000 miles.

When these interesting operating figures are paralleled with similar conditions on a coal burning trawler, they reveal the latter leaving port under reduced speed, her decks loaded with coal, every effort being made to increase the radius of action. At the fishing grounds, in case the fires are banked, it may take an hour to reach a full head of steam, hence valuable time is lost. With the Diesel power instant changes from full stop to full speed ahead without a minutes delay. In the case of the LILIAS the installation of motor power increased her cargo space equivalent to lengthening the ship 23 feet, a big factor in making successful trips to the fishing banks.

Another factor that is in favor of the Diesel powered trawler is the great saving in time in bunkering oil fuel over coal, and also the fact that oil is much cleaner to handle. Storing oil in deep tanks and double bottoms avoids mixing up coal dust and fish as in the case of the old time coal burner, which means much better and more marketable fish. Every bit of waste heat is utilized on these new trawlers which means saving of fuel and greater cruising radius. The progress of these two trawlers is being watched with keen interest by fishermen on both sides of the Atlantic.

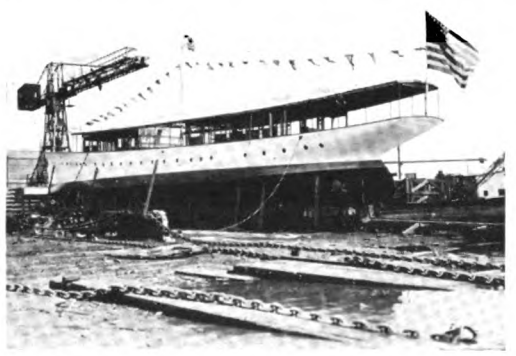
Diesel Yacht Colleen

THE twin-screw steel Diesel Yacht COLLEEN being built for Samuel A. Salvage, of New York; President of the Viscose Company, was completed at the yard of The Pusey and Jones Corporation, Wilmington, Del.

The COLLEEN was designed by B. T. Dobson, Naval Architect of New Bedford, Mass. She is 150 ft. length overall, 139 ft. 9 in. on the load water line, 22 ft. beam and has a draft of 7 ft. 6 in. when fully equipped. This vessel with her overhanging stern, slightly raking bow and extremely flaring forward sections, combines a striking appearance with the necessary essentials to make her a splendid seagoing craft. The hull is substantially constructed of steel, having teak decks laid over steel beams and plates, teak deck houses, steel framed shade deck with teak pilot house thereon, which is a departure on yachts of this size. Fuel oil and fresh water are carried in deep tanks built in with the hull structure; these with the transverse steel bulkheads divide the yacht into five watertight compartments.

The owner's accommodations consist of a large dining room in forward deck house with galley and pantry and a large living room in after deck house, all on the main deck; three double and three single staterooms and five bathrooms and wardrobes and closets on the lower deck. The dining room and living room are finished in selected paneled American walnut, these rooms having large plate glass windows. The rooms below deck are paneled and finished in ivory with walnut doors and trim. The furniture in all of the rooms is of walnut, having been designed specially for their respective locations and with carpets, upholstery, draperies, electric fixtures, and hardware selected to harmonize. Forward of the owner's quarters accommodation is provided for officers and crew.

The propelling machinery consists of two six-cylinder 600 s.hp. each Winton Diesel Engines, each with its line of shafting



Motoryacht Colleen has 1200 *Winton hp.*

driving bronze propellers. The various auxiliaries, pumps, compressors, etc., are electrically driven. The electric current is supplied by two 7½ kw. generators, attached to main engines, and two 10 kw. generators driven by six-cylinder gasoline engines. The windlass, steering gear, boat hoists, and refrigerating plant are all electrically operated. The vessel is heated throughout by a hot water system, having radiators in each room and ventilation is provided by electric fans. The owner's quarters also have a mechanical ventilation system for supplying fresh air.

The yacht's small boat equipment consists of a 23 ft. sedan type owner's launch, one 18 ft. crew's launch and 2 14 ft. dinghys. The yacht has a raking stack, signal mast and yard. It is expected that the COLLEEN will attain a maximum speed of 15 knots. At this speed her fuel and fresh water tanks have a capacity sufficient to permit a cruising radius of 3,000 miles.

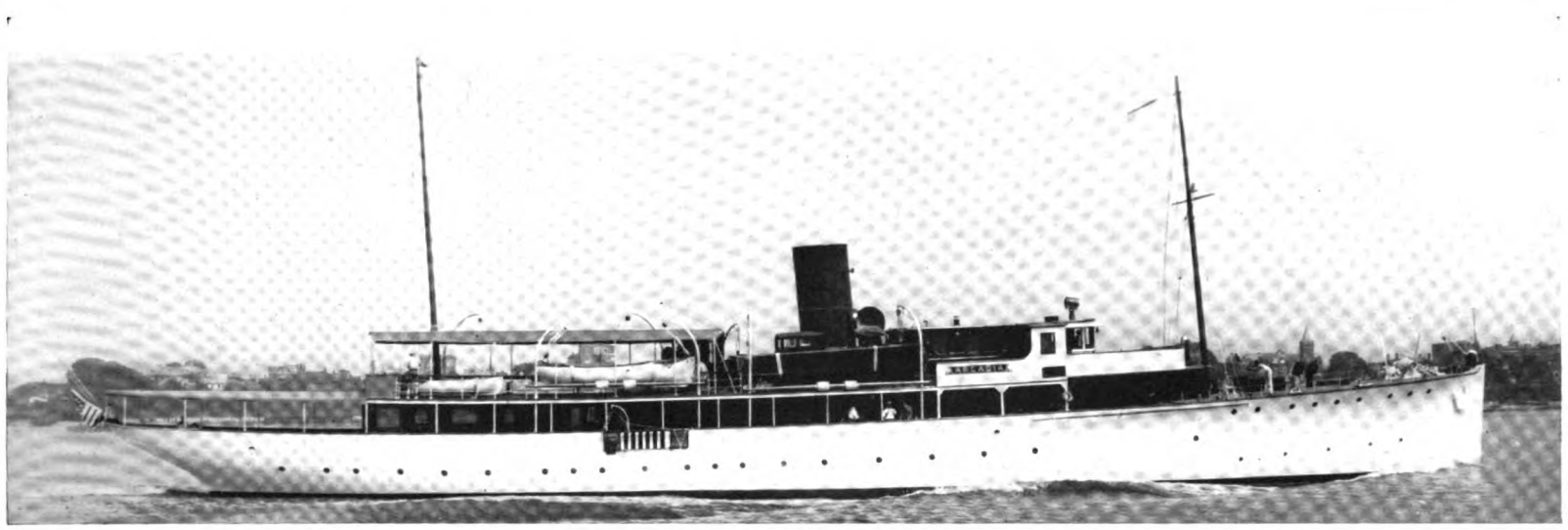
Madison-Kipp Corporation Buys Force Feed Lubricator Division of Detroit Lubricator Company

The Madison-Kipp Corporation of Madison, Wisconsin, has acquired by purchase from the Detroit Lubricator Company of Detroit, Michigan, their mechanical force feed lubricator division, except the locomotive type of lubricator. By this purchase the Madison-Kipp Corporation acquires all equipment, patents, designs and inventory used in the production of Detroit Models "G," "JT," and "JTS" force feed lubricators. The Detroit Lubricator Company will continue to manufacture their hydrostatic type of lubricators as well as their locomotive force feed lubricator.

All physical assets involved in the purchase will be shipped to Madison and all activities in connection with this new line will be handled at the factory and offices in Madison.

The Madison-Kipp Corporation and the Detroit Lubricator Company have been leaders in the lubricator industry for thirty years, producing and selling force feed lubricators to engine and machinery builders for that entire period. The Detroit Lubricator Company are also large manufacturers of carburetors, radiators, valves and accessories for heating plants which lines are not in any way involved in this present arrangement.

This transfer is an outright purchase and in no way affects the capital stock or management of the two companies.



Motoryachts and Motoryachting

Diesel Yachts, Now Increasing Numerically and in Size, Constitute an Important Branch of the Ship Construction Industry

WITH nearly 150 Dieselized vessels of the pleasure craft type owned and operated on United States waterways at the present time, and more building, it would seem apparent that American yachtsmen are convinced of the superiority of the Diesel engine over other power units for yacht propulsion. Yachting activity is a very direct measure of a country's prosperity and it is not surprising to find America easily to the fore where yacht construction of all types is considered. The yacht industry may well be considered a very important branch of the American marine industry.

The yachtsman of today finds in his modern motoryacht a combination of fine seagoing qualities, speed, long cruising radius, admirable accommodations, economy and reliability—made possible by the perfection of the Diesel engine. In fact the advent of the Diesel engine has revolutionized yachting as much as other forms of marine transportation. In the motoryacht as in the motorship, new features of design and construction have been evolved to meet the particular requirements of the new power plant.

One factor, above all others, which has been instrumental in popularizing the motoryacht, is the low fuel consumption and the resultant low operating cost. It has been estimated that the fuel cost per hour of a moderate speed, seagoing motoryacht underway is actually less than for a modern high-speed launch. The fuel cost of a steam yacht is three times greater underway and 15 times greater in port than for a Diesel driven vessel of the same size, but having a cruising radius nearly 4 times greater.

The cruising radius of a yacht has been more than tripled by reason of the low fuel consumption of the Diesel. A coastwise steam yacht becomes a transoceanic cruiser under Diesel power. The medium sized motoryacht ROBADOR, for instance, with a waterline length of only 148 ft. 6 in., has a fuel, food and water storage capacity to provide a cruising radius of over 6000 miles; and the motoryacht JOSEPHINE, with a waterline length of 132 ft., has a cruising radius of 5000 miles. Due to this low fuel consumption and the resulting small space required for fuel stowage, no accommodation need be sacrificed to provide for a big cruising radius. The long cruising radius of the motoryacht also eliminates the annoyance of incessant stoppage in unaesthetic ports to refuel. Conversely, when refueling is necessary, a full capacity can be taken on quickly, noiselessly and cleanly.

Then too, cleanliness underway is most desirable in a pleasure craft. The owner of a Diesel powered yacht is not troubled with smoke, soot and the usual steam vessel dirt. Decks can be kept spotlessly clean and the paint of deck houses is not dimmed by the smudge of smoke.

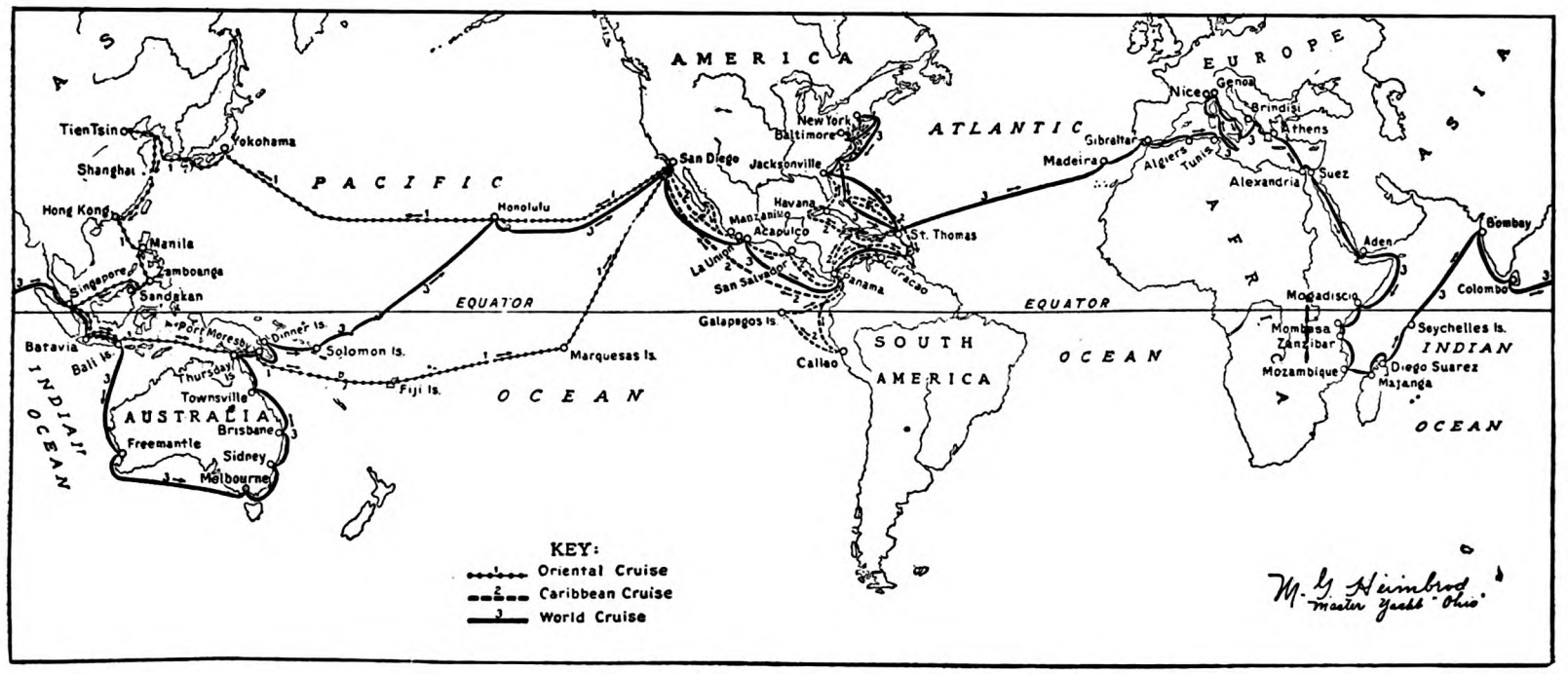
There is a further reduction in maintenance costs in the smaller crew required by the motoryacht. The crew of a motoryacht is roughly 25 per cent less than for a steam yacht of the same size.

The Diesel engine as a compact power unit occupies less space than a steam en-

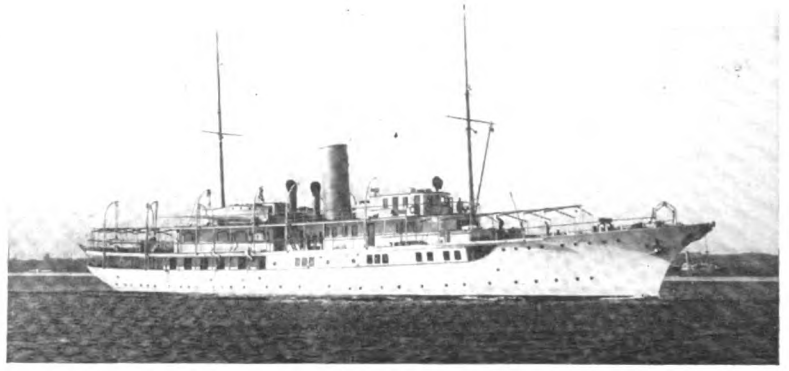
(*Continued on page* 412)

Motoryacht	Owner	Designer and Builder	Len. W. L.	Ext. Breadth	Depth	Make of Engines	No. of Engines	Total HP.
ALARWEE		L. E. Gary Ballard Marine Ry. Co.	79.0	15.6	9.75	Atlas	2	...
ALCALDA	O. L. Mills	Morgan Barney J. M. Bayles & Sons	96.0	15.3	7.8	Winton	2	300
ALCEDO	G. W. C. Drexel	T. D. Bowes Smith & Williams	99.25	18.5	10.6	Bessemer	2	340
ALCYONE	H. W. Putnam	Tams, Lemoine & Crane George Lawley & Son, Corp.	142.0	30.0	17.6	Winton	2	450
ALICAN	C. W. Wiley	Todd Drydock and Construction Corp., Seattle	116.0	20.0	7.0	Winton	2	500
ALOHA	A. C. James	Tams, Lemoine & Crane Fore River Sb. Corp.	165.8	35.5	17.0	Winton	3	900
ALPHA	G. M. Allen	H. J. Gielow, Inc. Welin Boat & Davit Cor.	94.0	20.0	9.25	Bessemer	2	300
AMIDA	E. R. Behrend	Cox and Stevens Krupp's Germania Werft	160.0	27.0	15.5	Krupp	..	800
ARA	W. K. Vanderbilt	C. E. Nicholson Camper & Nicholson, Ltd.	213.0	31.25	13.75	Atlas-Polar	2	500
ARA*	E. B. Dane	Herreshoff Mfg. Co. Herreshoff Mfg. Co.	152.0	24.0	13.8	Winton	2	600
ARA	E. B. Dane	H. J. Gielow, Inc. Bath Iron Wks.	240.0	36.3	14.5*	Bessemer	2	3000
ARAGUAN	Wm. H. Smith	E. B. Schock Delano Brusstar	72.5	17.3	9.75	Mianus	2	...
ARAS	H. J. Chisholm	Bath Iron Wks. Newport News Sb Co	149.5	26.2	12.8	Winton	2	950
ARCADIA	Mrs. H. R. Hardwick	Cox & Stevens Newport News Sb. Co.	177.0	27.5	12.8	Winton	2	1600
CAROLINE	Johnson	H. J. Gielow, Inc. Geo. Lawley & Son, Corp.	162.8	27.5	16.5	Bessemer	2	1600

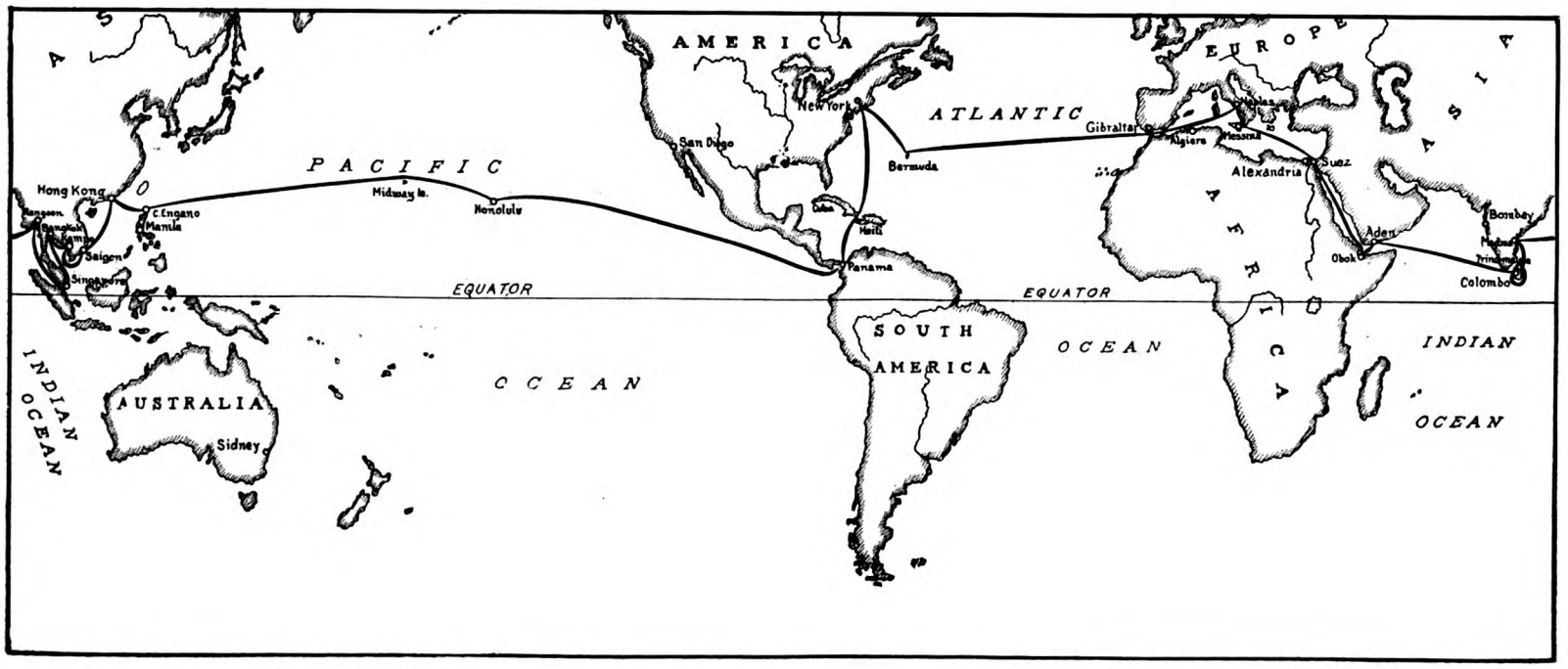
*Burned



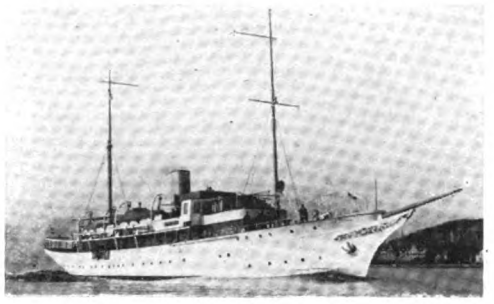
Above: Map showing extended cruises of My. Miriamichi—Ex-Ohio—Pictured at the left. My. Miriamichi is powered with two Winton Diesels developing a total of 700 hp.



Below: Map showing 'round the world cruise of My. Warrior pictured at the right. Krupp Engines. 1800 hp.



Dolphin—Winton Engines—1100 *hp.*



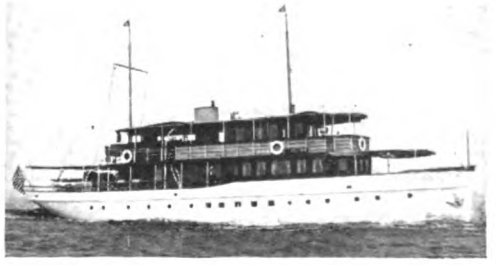
Happy Days—Krupp Engines—800 *hp.*

Vedette—B. & W. Engines—500 *hp.*

Motoryacht	Owner	Designer and Builder	Len. W. L.	Ext. Breadth	Depth	Make of Engines	No. of Engines	Total HP.
BIENESTAR	A. E. Wheeler	Tams and King Dicht Burn Boats, Ltd.	97.0	19.0	8.5	Winton	2	300
BETHULIA	Talbot Aldrich	Murray & Tregurtha Co. Murray & Tregurtha Co.	55.0	11.5	5.25	Cummins	1	50
BLACK EAGLE	August Heckscher	T. D. Bowes Smith & Williams Co.	55.0	17.9	10.25*	Fairbanks-Morse	1	...
BLACK SWAN	F. C. Hubble	Worcester-Cryder Worcester-Cryder	118.0	20.3	10.5	Atlas-Imperial	2	...
BLUE MOON	Mrs. M. T. Garland	Wm. H. Hand, Jr. Camden and Rockland	84.6	22.5	11.0	Atlas	1	...
BLUE DOLPHIN	S. H. Velie	W. J. Rove Shelburne Sb., Ltd.	77.0	22.5	12.0	Bessemer	1	170
CAMARGO	Julius Fleischmann	H. J. Gielow Bath Iron Wks.	225.0	32.3	14.5*	Bessemer	2	1600
CARITAS	J. P. Bartram	Cox and Stevens Germania Werft	147.0	25.6	12.3	Krupp	2	700
CATHERINE	J. H. Scott		88.0	18.0	7.0*	Foos	1	200
CHELSEA	J. F. Harris	G. L. Watson & Co. Ailsa Sb. Co., Ltd.	129.0	23.2	12.3	Atlas	2	...
COLLEEN	S. A. Salvage	B. T. Dobson Pusey & Jones Corp.	139.75	22.0	9.5	Winton	2	1200
COLONEL	E. H. R. Green	Gibbs Gas Engine Co. Gibbs Gas Engine Co.	127.0	30.0	6.8	Hvid	2	...
COMOCO	R. W. Judson	J. H. Wells, Inc. Defoe Boat and Motor Wks.	132.5	23.6	12.0	Bessemer	2	600
CONQUISTA	Mrs. E. B. Gifford	Navy Dept.—U. S. A. Navy Yard	105.4	14.5	8.8	Fairbanks-Morse	2	160
CONSTELLATION	H. M. Sears	Edward Burgess Henry Piepgras	108.4	24.9	12.9	Winton	1	150
CORONET	I. T. Bush	Cox and Stevens Krupp's Germania Werft	150.0	27.0	15.6	Krupp	..	800
CRESSIDA	Herman Oelrichs	Cox and Stevens Krupp's Germania Werft	125.0	28.0	21.2	Krupp	1	250
CRUSADER	A. K. Macomber	Camper and Nicholsons Camper & Nicholson	173.5†	27.5	15.0	Sulzer	2	800
CUTTY SARK	Alexander Smith	Tams, Lemoine & Crane Harlan & Holingsworth Co.	110.0	26.0	19.0	Winton	2	300
CYNTHIA	M. B. Mills	Cox and Stevens Tebo Yacht Basin Co.	122.5	23.0	11.5	Winton	2	450
CYPRUS	James Sherman	Cox and Stevens Krupp's Germania Werft	206.0	34.0	19.0	Krupp	2	2200
DAUNTLESS	H. W. Hanan	T. O. Wells S. I. Sb. Co.	150.0	33.75	18.5	Krupp	1	...
DISCOVERY ISLE	E. G. Beaumont	Thomas Halliday Quan Lee	....	10.5	...	Atlas-Imperial	1	50
DOLPHIN	M. L. Schiff	Cox and Stevens Newport News Sb. Co.	170.0	24.0	13.0	Winton	2	1100
EL DORADO	J. E. Elliot		70.0	15.0	7.25*	Swedish-Skandia	2	70
ELIA	Geo. Whittel, Jr.	J. F. Craig Long Beach Sb. Co.	105.0	21.0	9.5	Nelseco	..	300
EL MISTICO	E. Michelson		44.0	...	...	Fairbanks-Morse	1	40
FAITH	W. W. Shaw	J. G. Hanna A. D. Story	86.0	24.7	11.4	Standard	1	....
FAITH	I. E. Raymond	J. G. Alden Chas. Butson	76.2	13.5	6.0	Mianus	1	65
FLORENCE V	John Q. Adams		50.0	14.0	...	Cummins	1	50
GEORGANNA	G. L. Craig	G. L. Craig Craig Sb. Co.	70.0	21.0	11.25	Mianus	1	....
GINGER DOT	Frank B. Stearns	Luders Marine Const. Co.	....	...	...	Mianus	2	160
GOODWILL	Keith Spaulding	Bethlehem Shipbuilding Co. H. J. Gielow, Inc.	161.0	30.0	15.3	Nelseco	..	...
GUINEVERE	Edgar Palmer	A. L. Swasey Geo. Lawley & Son, Corp.	150.0	32.5	18.75	Winton	2	800

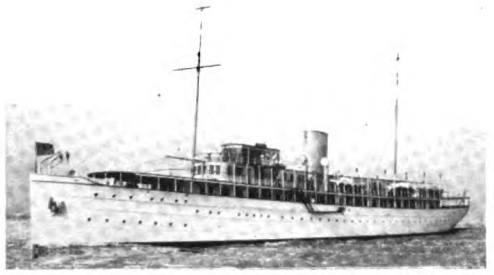
Ara—Winton Engines—900 *hp.*

Josephine—Winton Engines—550 *hp.*



Caroline—Bessemer Engines—250 *hp.*

Robador—Winton Engines—900 *hp.*



Savarona—Bessemer Engines—3000 *hp.*

Sequoia—Winton Engines—1600 *hp.*

Motoryacht	Owner	Designer and Builder	Len. W. L.	Ext. Breadth	Depth	Make of Engines	Engines No. of	HP. Total
HAIDA		Cox and Stevens Krupp's Germania Werft	178.0	30.0	17.3		..	1500
HAPPY DAYS	I. C. Copley	Cox and Stevens Krupp-Germania Werft	165.25	27.0	10.5*	Krupp	2	800
HARDI BIAOU		J. G. Alden	110.0	...	...	Winton	1	100
HUSSAR	E. F. Hutton	Cox and Stevens Burmeister & Wain	167.0	33.2	15.2	B. & W.	1	650
ILLYRIA	Cornelius Crane	H. J. Gielow, Inc. M. V. Martinolich	147.0	30.0	12.6*	Bessemer	1	300
INGOMAR	Spencer Borden	J. G. Alden	87.0	24.25	14.2*	Standard	1	75
ISTAR	H. S. Leyman	J. G. Alden Geo. Lawley & Son, Corp.	67.0	20.0	9.5*	Winton	1	100
JEZEBEL	T. L. Chadbourne	Cox and Stevens Krupp-Germania Werft	160.0	27.1	11.0*	Krupp	2	750
JOSEPHINE	U. H. McCarter	Cox and Stevens Newport News Sb. Co.	132.0	24.2	11.0	Winton	2	550
KALLISTO	W. W. Near	Max Oertz Krupp-Germania Werft	145.0	28.5	15.0	M. A. N.	1	....
LONE STAR	G. C. Bourne	Cox and Stevens Krupp's Germania Werft	160.0	26.75	14.5	Krupp	2	800
LUANCO		H. J. Defoe Defoe Boat and Motor Wks.	105.0†	...	...		..	....
LYNDONIA	C. H. K. Curtis	Consolidated Sb. Corp. Consolidated Sb. Corp.	200.0	30.1	15.8	B. & W.	2	2000
MALAINA	G. M. Moffett	Tuerssen Co.	96.5	17.0	...	Maybach	3	....
MALIBUS	Mrs. M. H. Adamson Mrs. M. K. Rindige	L. E. Geary Blanchard Boat Co.	95.0	19.5	11.0	Washington-Estep	2	240
MAMIE O.	Robt. Cakman		120.0	...	...	Nelseco	2	360
MARCHETA	R. M. Hollingshead	M. M. Whitaker Mathews Boat Co.	100.0	18.0	10.25	Craig	2	....
MEMORY III	A. E. Fitkin	Thos. D. Bowes DeFoe Boat & Motor Co.	143.0	23.0	9.6*	Bessemer	2	850
MICHABO	S. Norton		92.0	22.5	...	Fairbanks-Morse	1	150
MICHABO	F. L. Carlisle	C. A. Morse Chas. A. Morse & Son	85.0	21.5	10.5	Bolinders	1	....
MIRAMICHI	H. D. Walbridge	Cox and Stevens Newport News Sb. Co.	163.5	26.0	14.6	Winton	2	700
MOBY DICK	F. S. Fish	H. J. Gielow Bethlehem Sb. Corp.	101.2	24.8	10.0	Krupp	1	....
NAROCA	S. R. Campbell	B. T. Dobson David Johnson	92.0	19.0	7.5	Winton	2	200
NENEMOOSHA	Dr. E. R. Kirby	Edward Carroll Amer. Car and Foundry Co.	90.0	17.0	7.7	Nelseco	2	....
NENEMOOSHA	A. I. duPont	Burgess, Swaser & Paine Newport News Sb. Co.	125.4	22.25	10.8	Nelseco	2	....
NEVADA	Dev. H. Warner	Tams and King H. B. Nevins, Inc.	103.0	12.0	5.5	Standard	2	300
NEZ PEWER	Prince Youssoff (Egypt)	Ramage & Ferguson Ramage & Ferguson	235.0	29.6	17.0	Sulzer	2	1900
NORSAL	Powell River Co., Inc.	E. B. Schock W. R. Menchious	125.0	19.25	10.6	Standard	2	300
NORTHERN LIGHT	John Borden	H. C. Grebe & Co. W. F. Stone & Sons	106.0	30.0	12.0	Fairbanks-Morse	2	....
NOURMAHAL	Vincent Astor	Theo. Ferris, and Krupp's Germania Werft	260.0	41.5	25.7	Sulzer	..	3000
OCEANUS	J. W. Kiser	Cox and Stevens Germania-Werft	149.2	24.7	14.25	Krupp	2	700
OUANANICHE	P. K. Hudson	R. E. Winslow Vinyard's Sb. Co.	70.0	22.3	9.75	Atlas	1	....
OUTBOUND	S. W. Labrot	Tams, Lemoine & Crane Geo. Lawley & Son Corp.	108.6	16.0	12.9	Mianus	2	....
PANDORA	Lake Union D.D. Co.	Navy Dept. U. S. A. Puget Sound Navy Yard	105.0	14.6	8.5	Atlas	2	....
PARTHENIA	Parthenia Corp.	N. G. Herreshoff Herreshoff Mfg. Co.	108.0	18.0	8.8	Fairbanks-Morse	1	120
PASADO MANANA	Lee A. Philips		96.0	20.0	9.0	Atlas-Imperial	1	200

Spray III—Bessemer Engines—150 *hp.*

Sumar—Bessemer Engines—840 *hp.*

Lyndonia—B. & W. Engines—2000 *hp.*

(*Continued from page* 410)

gine of equal power with its boilers and auxiliaries. This saving in engine room space may be passed on to the owner's quarters, or a reduction in the size of the entire yacht may be effected while still retaining the same power and cruising radius. In actual fact as a pretty fair average we may say that the complete engine room of a seagoing motoryacht occupies approximately but one-fifth of the waterline length.

Since the Diesel engine has made possible transoceanic and round the world cruises for vessels of this type, it has become necessary to alter, in many cases, conventional yacht design and construction to provide for the more strenuous class of service in which they are to be used, and also properly to accommodate the propelling machinery in a strong seaworthy hull. High seagoing bows, often with raised forecastles, plenty of freeboard and ruggedness are evident in the modern motoryacht. There is a distinct tendency towards the short, slightly raking stem in place of the graceful clipper stem which was wont to characterize the steam yacht of one or two decades ago. Many people think that the motoryacht loses something in beauty to her steam predecessor. In some cases this is true. There are some remarkably ugly Diesel yachts afloat today. But the "ugly ducklings" are balanced by an equal num-

Motoryacht	Owner	Designer and Builder	Len. W. L.	Ext. Breadth	Depth	Make of Engines	No. of Engines	Total HP.
PAWNEE	H. P. Bingham	Cox and Stevens Newport News Sb. Co.	151.0	26.6	13.9	Winton	2	900
PRINCIPIA	L. A. Macomber		96.0	18.5	7.5*	Atlas-Imperial	1	250
QUEEN ANNE	I. E. Emerson	Cox and Stevens Krupp's Germania Werft	150.0	27.0	15.5	Krupp	..	800
RANELPE	Austin H. Perry	Luders Marine Const. Co.	95.0	...	...	Winton	2	400
RANGER	S. A. Salvage	B. T. Dobson Geo. Lawley & Son, Corp.	102.0	18.2	9.25	Winton	2	300
RDREAM	R. C. Vilas	H. C. Grebe & Co. Great Lakes Sb. Corp.	98.25	18.5	6.5*	Bessemer	2	300
RENE	A. P. Sloan	J. H. Wells Consolidated Sb. Corp.	110.25	21.5	10.4	Winton	2	400
REOMAR III	R. E. Olds	Cox and Stevens Defoe Boat and Motor Wks.	100.0†	18.6	8.0	Bessemer	2	300
RIO BONITA	A. Melville Dollar		110.0	...	...	Vickers Petters	2	200
RIPPLE	E. C. Wilson	Cox and Stevens Germania Werft	126.0	23.1	12.5	Krupp	2	550
ROBADOR	Robt. Law, Jr.	Cox and Stevens Newport News Sb. Co.	148.6	26.2	13.0	Winton	2	900
ROSINCO	R. H. Morse	Coxe—Main Harlan & Hollingsworth Corp.	93.0	15.25	7.8	Fairbanks-Morse	1	..
SABALO	Van Lear Black	Tams, Lemoine & Crane Geo. Lawley & Son, Corp.	130.0	19.5	10.4	Winton	2	450
SACHEM	Geo. Whitney	H. J. Gielow Geo. Lawley Corp.	115.0†	21.0	7.5*	Bessemer	2	600
SACHEM III	R. B. Metcalf	Wm. Hand	75.0†	...	...	Cummins	1	75
SEQUOIA	Mrs. R. M. Cadwalader, Jr.	Cox and Stevens Newport News Sb. Co.	174.0	27.2	12.8	Winton	2	1600
SAVARONA	R. M. Cadwalader, Jr.	H. J. Gielow, Inc. Pusey and Jones Corp.	280.0	38.25	16.0	Bessemer	2	3000
SEA BORN	R. F. Howe	F. G. Pratt Ramage & Ferguson, Ltd.	163.0	27.1	12.1	Atlas-Polar	2	....
SEADRIFT	C. K. Beekman	J. G. Alden Livingston & Cooper, Ltd.	62.8	20.0	13.0	Mianus	1	65
SEA KING	Sailing Baruch	Baron Bliss N. S. Steel & Coal Co., Ltd.	138.8	28.7	9.3	Vickers-Petters	2	440
SEA SALES III	M. W. Sales	H. J. Gielow, Inc. Defoe Boat & Motor Co.	87.0†	16.0	4.5*	Bessemer	2	160
SEBONAC	A. C. Burton	Elco Company Elco Company	125.0	17.5	9.6	Enterprise	2	320
SEMIRAMIS	W. G. Trethewey	C. L. Seabury Gas Engine & Power & Seabury Co.	84.0	15.6	7.8	Mianus	1	65
SHADOW K	C. G. Fisher	Purdy Boat Co. Consolidated Sb. Co.	149.0	24.3	11.0	Winton	2	1000
SHIRLOHN	Geo. Williams	H. J. Gielow, Inc. Gidley Boat Co.	103.0	19.5	...	Bessemer	2	300
SIALIA	Henry Ford	Gielow & Orr Pusey & Jones Co.	191.25	27.0	17.3	Sun-Doxford	2	1500
SIELE	J. H. French	B. T. Dobson Pusey & Jones Co.	116.0	20.5	9.6	Winton	2	600
SIROCCO	F. S. Whitten	A. E. Luders Luders Marine Con. Co.	112.0	20.5	10.25	Winton	2	350
SOX II	Geo. W. Loft	Herman Lund Herman Lund	64.8	14.8	6.9	Cummins	2	100
SPEEJACKS	A. Y. Gowen	Wm. H. Hand, Jr. Geo. Lawley & Son, Corp.	95.0	26.0	14.2	Bessemer	1	460
SPRAY III	H. B. Joy	Purdy Boat Co. Purdy Boat Co.	72.0	16.0	8.5	Bessemer	1	150
STARLING	G. F. Tyler	J. G. Alden Rice Bros. Corp.	94.7	26.0	14.5	Winton	1	100
SUEJA III	James Griffiths	L. E. Geary Washington M. R. & Sb. Co.	116.0†	19.0	11.2	Washington-Estep	2	360
SUMAR	D. C. Whitney	H. J. Gielow, Inc. Todd Shipyard Corp.	152.5	26.0	16.25	Bessemer	2	840
SYLVIA	L. G. Thomson	J. H. Wells, Inc. Defoe Boat & Motor Wks.	125.5	21.5	11.0	Bessemer	2	460
TRED AVON II	A. J. Grymes	Cox and Stevens Brewer D. D. Co.	98.0	18.9	8.4	Winton	2	350
TYPEE	W. N. Shaw	Mathis Yacht Bldg. Co. Mathis Yacht Bldg. Co.	82.5†	13.5	7.4	Mianus	1	....
(Unnamed)	Geo. C. Bourne	Cox and Stevens	170.0	...	...	Krupp	2	800
UNGAVA	A. W. Johnson	J. G. Alden Chas. A. Morse & Son	64.6	20.0	10.0*	Cummins	1	75
UTOWANA	Allison V. Armour	Cox and Stevens Robert Jacob	151.0	25.2	13.8	Winton	2	700
VAGABONDIA I	W. L. Mellon	Gielow & Orr Kyle & Purdy, Inc.	133.6	20.25	11.8	Winton	2	450
VAGABONDIA II	W. L. Mellon	Cox and Stevens Krupp's Germania Werft	182.0	34.0	17.5	Krupp	2	1600
VEDETTE	F. W. Vanderbilt	Cox and Stevens Burmeister & Wain	148.0	26.2	14.6	B. & W.	2	1100
VELERO II	G. A. Hancock	Hancock-Muller Wm. Muller	128.0	20.0	10.75	Winton	2	300
VENCEDOR	R. P. Stevens	Cox and Stevens Geo. Lawley & Son, Corp.	83.0	17.0	7.4	Fairbanks-Morse	2	160
VICTOR	R. H. Goodall		63.0	13.0	6.0	Bolinders	2	100

Motoryacht	Owner	Designer and Builder	Len. W. L.	Ext. Breadth	Depth	Makers of Engines	No. of Engines	Total HP.
VIDOR	Carl Tucker	H. J. Gielow, Inc. Todd Shipyards Corp.	162.8	27.5	16.5	Bessemer	2	1600
VOYAGER II	Eversley Childs		70.0†	50.0	9.0	Fairbanks-Morse	1	40
WARRIOR	Harrison Williams	Cox and Stevens Germania Werft	210.0	35.0	17.5	Krupp	2	1800
WESTWARD	Campbell Church	L. E. Geary J. A. Martinolich	81.0	18.75	9.4	Atlas	1	....
WILL-O-THE-WISP	Ford, Payne & Sweisguth	Ford, Payne & Sweisguth F. F. Pendleton	50.0	16.0	...	Fairbanks-Morse	1	....
WINONA	A. E. Shumway		92.0	13.25	4.5	Bolinder	..	100
ZALOPHUS, JR.	John Ringling	H. J. Gielow, Inc. Consolidated Sb. Corp.	117.7	21.25	11.4	Nelseco	2	....
ZODIAC	John S. & Robt. W. Johnson	Wm. H. Hand, Jr. Hodgon Bros.	98.5	25.2	13.8	Atlas	1	....
Cruiser	Alfredo Cernadajs Buenos Aires	Frederic P. Humphreys Monmouth Marine Rwys. Co.	56.0	13.6	4.0	Cummins	2	60
Cruiser	B. C. Fincke	Frederic P. Humphreys Monmouth Marine Rwys. Co.	45.0	11.6	3.0	Buda	1	100
Cruiser	D. Walter Mabee	Frederic P. Humphreys Wm. E. Bunce Boat Yard	45.0	11.6	3.0	Buda	1	100
Cruiser	C. D. Cummings, Buffalo, N. Y.	Frederic P. Humphreys Monmouth Marine Rwys. Co.	39.0	10.6	3.0	Cummins	1	60
Cruiser	R. W. Rogers	Frederic P. Humphreys Monmouth Marine Rwys. Co.	39.0	10.6	3.0	Cummins	1	60
Cruising Ketch	Dickson B. Potter	Frederic P. Humphreys Wm. E. Bunce Boat Yard	48.0	13.6	5.0	Cummins	1	60

*draft †unable to determine if L.O.A. or L.W.L.

ber of fine, handsome vessels like the new SAVARONA or like Vincent Astor's new yacht which has the appearance of a small, powerful gunboat.

Modern motoryachting is indeed luxury yachting. Ample space is available in relatively small hulls for attractive as well as practical layouts, and in them competent naval architects have arranged veritable homes upon the water.

Diesel engines ranging from 40 hp. as in the tiny EL MISTICO to 3000 hp. in the palatial SAVARONA have been installed in American owned yachts with the most gratifying results. They are simple in operation and their reliability has been proven beyond question.

As was mentioned in MOTORSHIP'S special SAVARONA supplement, published with the March issue, motoryachting has moved hand in hand and has sometimes anticipated developments in marine engineering. The steam turbine, and before it, the steam reciprocating engine owe no little of their progress to the experimental and development work which was carried out in yachts. So, too, is it with the marine Diesel engine. Countless experimental data is being obtained by makers of all types of engines. The diversity of types is well illustrated by the list which is published in conjunction with this article. Both 4-cycle and 2-cycle, air and airless injection engines are well represented. High-speed, light weight units are rapidly being developed at the present time, and the high speed Diesel is now beginning to break into the realm of the gasoline engine.

The motoryacht requires powering which the American Diesel builder is especially equipped to supply at a reasonable price.

Fuel Cost Reduced $200 a Day

MANY remarkable illustrations of fuel savings with marine Diesels, as compared with steam operation, have come to light but there have been few of greater interest than the case of The tug West Branch No. 2 owned by the Great Northern Paper Company of Bangor, Maine, in the towing of booms, cut the fuel cost from $250 per day, when a steam tug was used for the work, to $50 per day when she was placed in service. The operations of the Great Northern Paper Company on Chesuncook Lake, Maine, call for the handling of large booms of spruce logs. The tows consist of one or more of these booms each of which contains approximately 5,000 cords of 4 ft. pulpwood surrounded by large boom logs chained end to end to make a pen for the 4 ft. lengths. Each boom covers a large area of water as the pulpwood is all floating loosely inside the boom logs. This makes an extremely difficult tow to handle and a very slow moving tow particularly against a head wind.

The accompanying tabulation shows a comparison of operating costs using a steam tug as compared with the cost of operation with the Diesel equipped tug. In this tabulation the fuel consumption of 301 gal. per day was obtained by dividing the total gal. consumed by the number of days from the time towing was started until all of the wood was towed. This included some of the time that the tug was not in operation, the loss of time being due to the tug breaking the propeller by hitting a large, partly submerged log.

In towing 51 booms with the Diesel tug this year there were 13 days saved as compared with the time required to do the same work with the steam tug the year before. There was also a saving in labor as the crew of the steam tug was ten men and only seven men are used on the Diesel equipped boat.

Comparison of Operating Costs Steam and Diesel Tugs

	Old Boat "A. B. Smith" Steam 1926	New Boat "W. B. No. 2" Diesel 1927
Started Towing	May 19	May 21
Finished Towing	Sept. 4	July 27
Time Towing	3 mo. 15 days	2 mo. 6 days
Crew	10 men	7 men
Time Taking Fuel	100 hours	13½ hours
Fuel Used per Day	10 tons	301 gal. ave.
Fuel Cost per Day	$250.00	$50.00
No. of Booms Towed	62	51

As the tug operates at a point 42 miles from the nearest railroad siding it is necessary to truck the fuel for this distance. Consequently fuel oil costs a little over 16 cents per gal. delivered at the tug while the coal cost is $25 per ton delivered at the same point. While this cost is increased for both the fuel oil and the coal in somewhat the same ratio, the cost of handling the fuel oil is less due to the fact that it has less bulk for the same number of heat units. The figures show in a very striking way what the operation of Diesel engines means to vessels that are located in remote places where the handling charges form an important part of the cost of fuel.

In addition to the above savings the Diesel tug is responsible for even greater savings than those shown by direct comparison. While the tug is operating it is necessary to operate two smaller boats around the logs, getting the booms ready for the large tug. The reduction in number of days required to do the work cuts off the expense connected with the operation of these two smaller boats. One of these boats is powered with a 60 hp. "CO" engine and one with a 30 hp. "CO" engine.

During the operations it is necessary to keep a crew of from thirty to sixty men in connection with the drive and it is also necessary to operate several smaller gasoline boats carrying provisions and supplies to the crews. The saving in time and expense in maintaining these crews is credited by the Great Northern Paper Company to the Diesel operated tug.

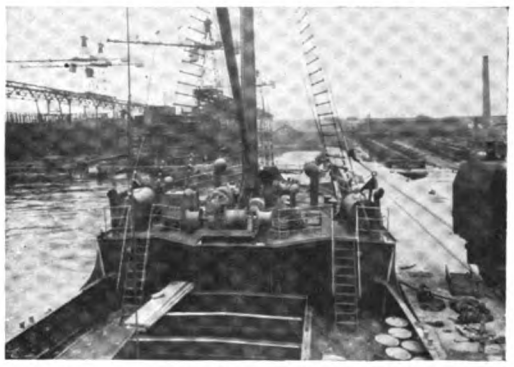
The WEST BRANCH No. 2 was built by the Great Northern Paper Company on the banks of Chesuncook Lake and all of the machinery was installed before the tug was launched. It is 91 ft. long, has a 21 ft. beam and a draft of 8 ft. The propeller is 72 in. diameter by 50 in. pitch and the speed running light is 12 miles per hour. In addition to the 360 hp. Fairbanks-Morse Diesel for the main drive there is also an 18 kw. F-M Diesel generator set which is used for lighting the vessel and for running the motor driven auxiliary air compressor and bilge pump. This bilge pump is a 3 in. centrifugal pump and auxiliary air compressor is driven by 7½ hp. direct current motor. Five fuel tanks provide the fuel oil capacity of 5,000 gal.

Diesels for Coasters—Now

Australia Adds Another Unit to Her Coastwise Motorship Fleet and Further Helps to Dispel the "Diesels for Long Run" Fantasy

IT has long been a sort of tradition among shipping men over the world that Diesel power for coasting vessels is neither practical nor economical, especially where ports of call are close together and coal supplies are available at various points along the run. A survey of the three sections of the world where the coasting trade is necessary on a large scale because of geographical conditions—the east and west coasts of North America and the eastern seaboard of Australia, will reveal many reasons why Diesel power has been apparently neglected for steam by old timers who still think of the coasting trade in terms of sailing days, out of the way ports with shallow harbors, and the steamer.

The East Coast of North America, particularly the United States, is peculiarly laid out for securing of fuel for coastwise ships. At Newport News the resources of the largest coal mining section of the Western Hemisphere are available for ships. This has naturally held many of the more conservative shipowners to the use of steam, with coal burning. The transition to oil burning even has been slow, although its advantages are too patent to have escaped attention entirely. The even greater economies of the Diesel engine in U. S. coastal waterways remains largely neglected. On the West Coast of the United States, particularly along the Columbia River, Puget Sound, and the great inland waterways radiating from there to the Aleutian Islands, 2,500 miles North,—the tip end of Alaska, the small coal burner, which superseded the famous lumber schooner, found plenty of fuel at Puget Sound and British Columbia ports. Hence the slow change to the economies of Diesel operation. On the Pacific Coast the coasting vessel has played a dominant part in the development of the great resources bordering on the sea, and still is the only means of communication north of Puget Sound. Hundreds of small ports scattered along the coast of Washington, Vancouver



Main cargo winch serves wide hatchway

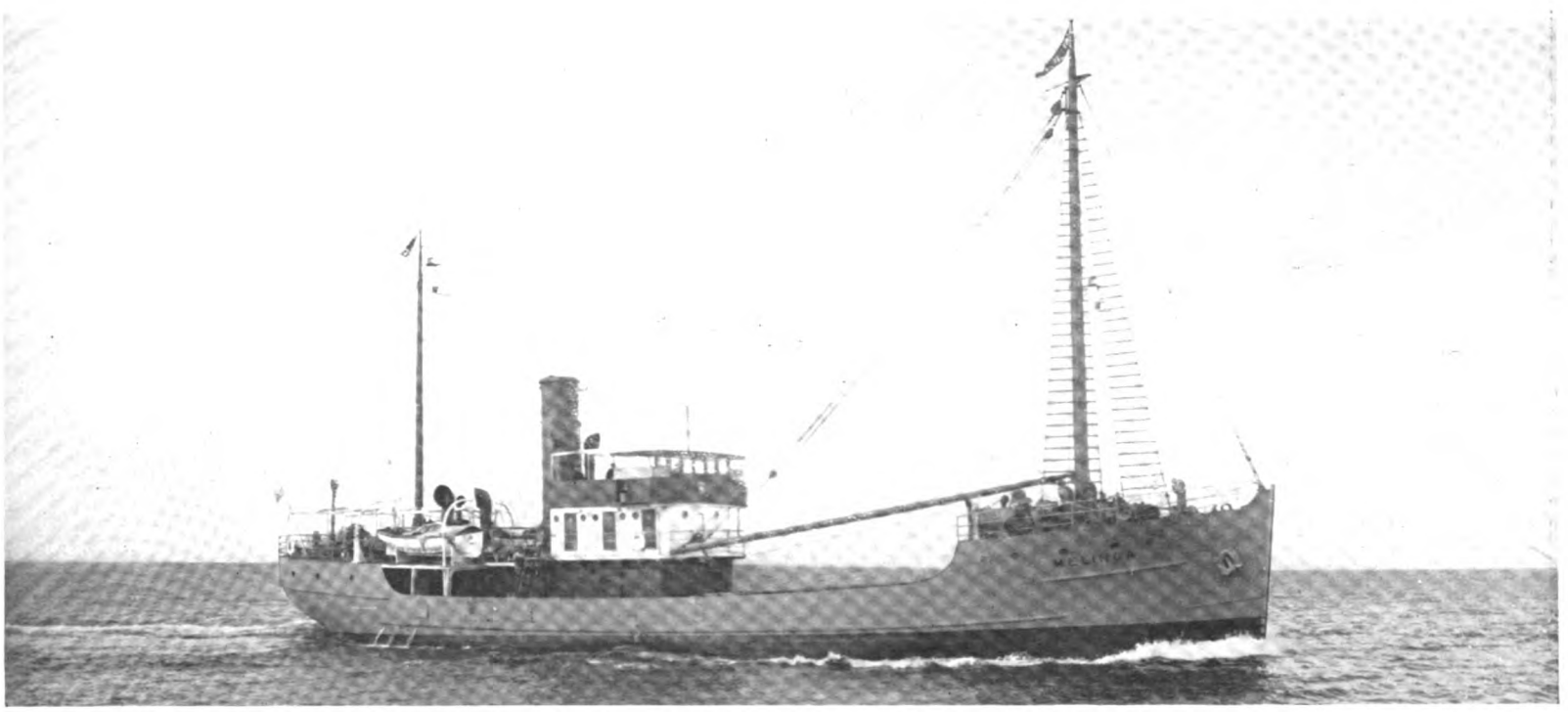
island, British Columbia and Alaska rely wholly on the coaster for food, clothing and supplies, and communication with the outside world. Because of the vast territory covered and the extreme ruggedness of the shoreline, making rail construction impossible, such transportation will continue to remain the only outlet for many years to come. With the cheap California oil, however, the scene is swiftly changing.

It has remained for Australia to lead the way with motor coastwise ships. Here a situation prevails similar to that of the east coast of the United States. With a coastline from Cape York to Tasmania of about the same length as the distance from Newfoundland to Florida, Australia has vast coal deposits at Newcastle, located in much the same relative location to Sydney and other big ports as Newsport News is to New York and Philadelphia. As the interior of the country is in parts comparatively sparsely settled, making railroad construction unprofitable, the coastwise vessel remains an important factor of transportation. During the past few years many new vessels of the most modern type have been placed in service, and notwithstanding the plentiful supplies of coal available, most of them have been motorships. Motorships, in fact, now carry coal from Newcastle. Australian shippers have proven the worth of Diesel powered coasters to a greater degree than any in other parts of the world.

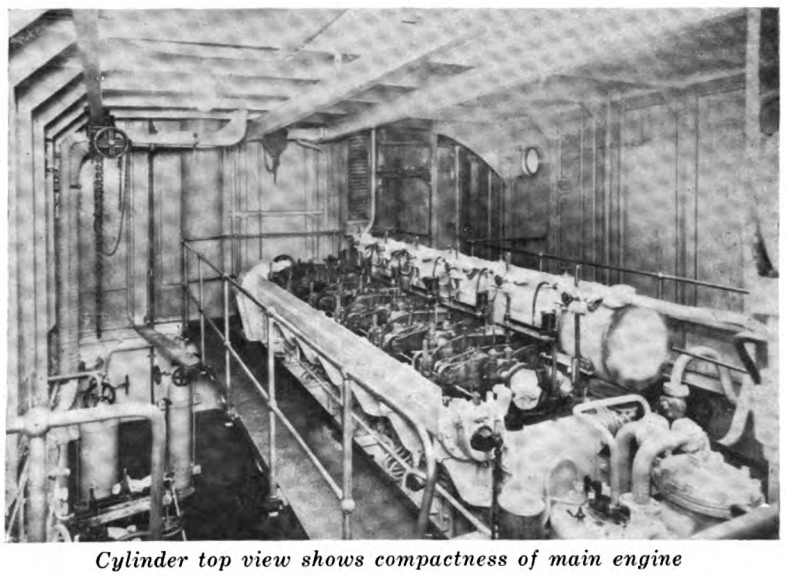
One of the latest addition to the fleet of coasters serving the Australian trade, is MS. MELINGA, built and engined by Burmeister and Wain, Ltd., of Copenhagen, for the North Coast Steam Navigation Co., Ltd., of Sydney, New South Wales.

The MELINGA has an overall length of 161 ft. 3 in.; a moulded breadth of 34 ft. 6 in.; a cargo capacity of 20,350 cu. ft. Her total deadweight capacity is 535.87 tons with a net tonnage of 242.81. From the drawing it will be noted that the hull is divided into six compartments by five watertight bulkheads,—the forepeak tank fitted for water ballast, cargo hold, deep tank for fuel oil, engine room and aft peak tank fitted for water ballast.

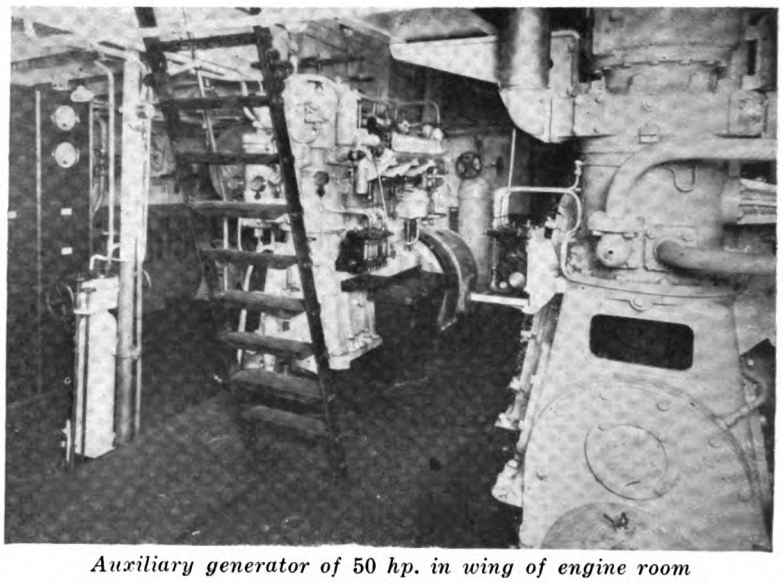
A complete steel deck runs throughout



***This is the type of handy coaster** (485 hp. and 536 tons cargo capacity) the Australians are now using in freight carriage*



Cylinder top view shows compactness of main engine



Auxiliary generator of 50 hp. in wing of engine room

the entire length of the vessel, supported by longitudinal lattice-girders at the sides of the hatch right through the length of the cargo hold, in the deep tank and also in the fore part of the engine room.

Besides serving as support for the deck, the girders increase the longitudinal strength of the ship. There is only one hatch, 42 x 41 ft. Between the fore and aft girders in the aft end of the cargo hold and also in a house on the deck, built together with the engine casing is fitted an insulated refrigerated room for transport of butter. The refrigerating machine is electrically driven and works on the open ammonia principle.

The ship is capable of carrying a fuel oil supply of about 110 tons, partly in the deep tank on the fore edge in the engine room and partly in the side tanks in the foremost part of the cargo hold. The peak tank and aft peak tank carry totally about 78 tons water ballast.

The vessel has 2 masts, and one 8-ton derrick rigged to the foremast. A cargo winch is also fitted for operating the derrick. This winch as well as the windlass and the warping winch on the poop are electrically driven.

In the forecastle are situated cabins for the crew and in the wing house is washroom with shower bath and lavatory. In a house built together with the forecastle on the aft edge of same will be found 2 spare cabins.

In the poop are found mess room for the crew and mess room for the officers and engineers, the cooks and stewards cabin, provision store and various rooms for stores, shower bath for officers and also room for the refrigerating machinery.

The propelling machinery consists of one six-cylinder, four-cycle, single-acting Diesel engine of the B. and W. trunk type, capable of developing 485 i.hp. at 190-200 r.p.m. and estimated to give the ship a speed of about 9 knots.

On the engine and driven from same are fitted a cooling water pump of the two-plunger type, two bilge pumps, one lubricating oil pump and one fuel oil service pump, making the engine self contained.

The engine is forced lubricated. The crankshafts and connecting rods are enclosed in oiltight casings, large doors being fitted to give access for inspection and overhaul.

The auxiliary machinery consists of a Diesel of B. & W. enclosed and forced lubricated auxiliary Diesel generator type, capable of developing 50 b.hp. at 500 r.p.m.

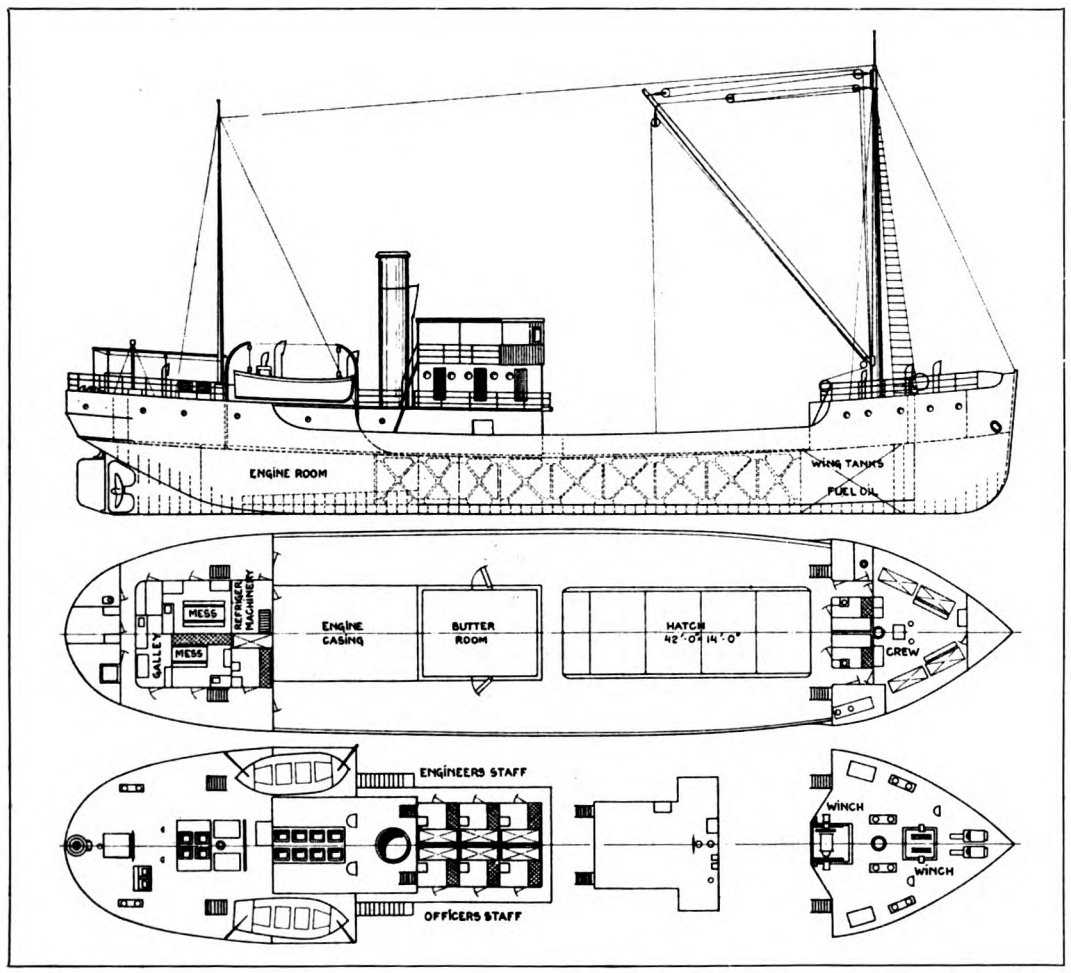
Under normal conditions at sea and during day hours when no need for electricity, the hand steering wheel will be used and none of the auxiliary engines will be kept running, only using the small dynamo engine during night hours.

The trial trip of the MELINGA took place in the Sound at Copenhagen. With the ship loaded down on her marks a speed trial over the measured mile was carried out, on which a speed of 9.88 knots was made, with the engine developing 596 i.hp. at 215.5 r.p.m.

A fuel consumption test was later held, lasting 2 hours, and in this the main engine developed 424 i.hp. at 191 r.p.m. with a mean consumption of 136.2 gr. per i.hp. These results must be considered very fine in view of the unfavorable weather conditions prevailing.

Immediately after the completion of the successful trial trip she went on her service going first to Trondhjem, loading a cargo of wood pulp, and then she started on her long voyage to the Australian coasts, going via the Atlantic Ocean through the Panama Canal and the Pacific.

Vessels of the type of the MELINGA are making motorshipping history in Australia and their performance should be watched by everyone in the industry, with a view to applying the experience gained by coasters in the South Pacific trade, to U. S. East and Northwest coast.



***Ms. Melinga** is a handy general cargo type coaster, somewhat reminiscent of lumber schooners on the Pacific Coast*

Another American Double-Acting Diesel

Development of a New Sun Engine Has Now Reached the Commercial Stage, and Is Here Exclusively Discussed

By J. Barraja-Frauenfelder*

FOR the past five years we have watched the development at the Sun ship and engine plant in Chester, Pa., of a two-cycle, double-acting Diesel marine engine. This power unit, which also is intended for ultimate production for high-power stationary work, gave distinct evidence during this period of being more than "just another addition" to the numerous designs and makes of oil engines already on the market. This promise largely accounts for the interest of the Sun Shipbuilding & Dry Dock Company's executives in its development when they already manufacture a proven successful marine Diesel, namely, the Sun-Doxford, which, of course, they will continue to build. The new unit will fill the gap in sizes and installations not now covered by its older brother, so will not be competitive.

For reasons concerning the thorough and exhaustive experiments and tests, it was conservatively considered desirable to withhold all publicity on its engineering features until the officials of the company were thoroughly satisfied that the engine had reached a stage of commercial success.

This new engine design is based on patents granted to the late Hans R. Setz, a co-worker for some years with the late Dr. Rudolph Diesel, and who was associated with the American Diesel engine industry for over ten years prior to his death in 1924.

In its final stage of production the engine is of very simple design with crosshead construction, and follows lines calculated to reduce manufacturing, operating, and maintenance cost to a new low point in sizes from 300 to 2,000 indicated horse-power per cylinder.

Its engineering aspects are such as to warrant MOTORSHIP placing a detailed description before its readers. This is now being done in our pages through the cooperation of the Sun Shipbuilding & Dry Dock Company, who have established a notable record in Diesel engineering. This description will be covered by two articles, the first of which covers the general characteristics of the engine following this editorial foreword. Part 2 will deal with the more detailed engineering features of the design and will be published next month.

The origination of a new design of Diesel must be justified by the potential demand for an engine of that particular kind, for it is an expensive undertaking, which must meet with success to be profitable. It is apparent that the Setz engine will link up a chain of existing types, making available, to the ship purchasing public, another engine in moderate sizes, which will not only fill a vacancy in the existing list, but will be suitable to almost all forms of marine and stationary power.

The producers of this engine have not been working with but the single object in view, of meeting an existing demand as to size, weight and adaptability to marine service alone. They have foreseen the need of producing a prime mover that will meet a number of divergent power needs. Hence we find, after careful analyses of the design, an engine which may be built by the most modern and efficient production methods, and there appears to be no reason to keep it in the "custom built" class. Thus we may expect, with further development of this engine, a substantial saving in cost of manufacture. A full realization of such saving could not, of course, be expected in the first engines which will be built by laboratory methods, and we are fully aware of the cost of such methods which have been used in the manufacture of a number of large American Diesels where repeat orders were not assured and the cost of standardization would be excessive.

In order to begin the task in a comprehensive way it was decided that the smallest possible unit capable of demonstrating the advantages of the double-acting principle should be built first, in order to ascertain the lower limit in size; second, to keep development costs down to the minimum commensurate with the results aimed at. It was thought also that certain features, such as valve arrangement in the lower cylinder head, stuffing-boxes, etc. (rather difficult satisfactorily to obtain in the confined space of a small cylinder) if successfully solved, would be much easier of accomplishment in a large cylinder. For these reasons a unit of 16 in. bore and 22 in. stroke was selected, which when operating at about 180 r.p.m. would produce approximately 300 i.hp. Later two more cylinders were added.

When it is considered that several double-acting oil engines are now on the market and performing satisfactorily, a new development along these lines can only be justified if greater simplicity is obtained and along with it lower costs—costs sufficient to bring the price of marine and stationary oil engines so close to that of good steam installations, that the operating economics of the Diesel oil engine will result entirely in a net operating gain and not be absorbed largely by a greater capital investment. With this preamble we will leave the further technical description of this unit to Mr. Frauenfelder.

The inherent advantages of the double-acting Diesel engine are readily recognized to lie in the small cylinder size, greatly reduced weight, and therefore decreased cost of production for a given capacity. While these advantages are pretty generally conceded for engines of large capacity, principally for the reason that a practical limit in the size of single-acting cylinders has about been reached, not nearly the same measure of accord is found regarding the lower practical limit of the double acting engine.

A very simple and cheap type Diesel engine is the one where a trunk piston also serves as a crosshead, and depends merely upon air circulation for cooling. In modern 4-cycle practice this method is used in cylinder sizes up to 16 in., and even larger where speed and load conditions are favorable; with two-cycle engines only more limited cylinder sizes permit of such an arrangement.

In order to prevent seizure and cracking of pistons, and to always ensure efficient lubrication in continuous operation under heavy loads (such as in marine practice), larger pistons require artificial cooling by oil or water circulation. The conveying system for this cooling liquid (usually telescopic tubes), while in itself comparatively simple, introduces mechanical complications on account of the confined space within which it has to be placed, and on account of the ever present danger of excessive misalignment due to the inevitable wear and deformations of trunk pistons. On account of this the crosshead arrangement, which virtually eliminates these complications, is more and more coming into favor in those sizes that require artificial piston cooling; this is particularly true in 2-cycle practice where engines of 15 in. cylinder bore and even smaller are now commonly built in the crosshead form. Experience has shown that the higher all around reliability of such engines more than offsets their higher first cost.

With the crosshead, single-acting engine we have arrived at a construction which in weight and space requirement will not be appreciably exceeded by a double-acting engine of the same bore and stroke; identically the same crosshead and guides will of course serve either type, and since it is the upper cylinder end that exerts the maximum load upon the structure the entire engine framing can also be the same; the upper cylinder end, cylinder head, valves and valve gear also will be the same for either type, their operating conditions being in nowise affected by whatever use is made of the lower cylinder end; likewise in 2-cycle engines the same exhaust and scavenging ports, and the control means for the latter, can be made to serve the upper as well as the lower cylinder end, so that in this respect also there need be no difference between either type.

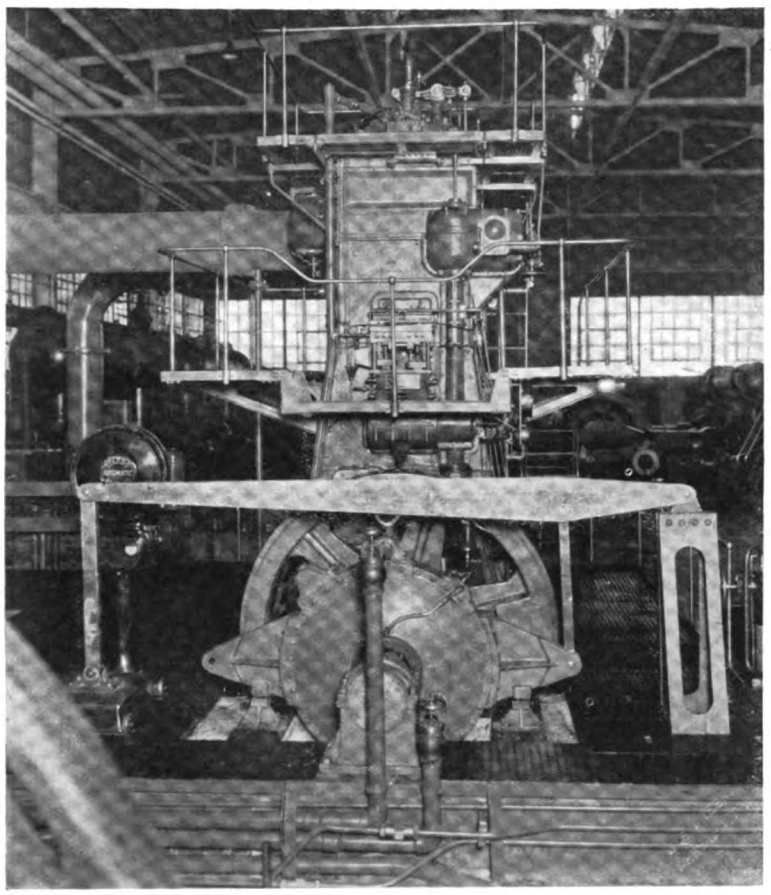
The only outstanding feature of distinction in the double-acting engine is the lower cylinder end with the necessary valves, the water-cooled cylinder head, and the stuffing box for the piston rod. This lower cylinder end adds approximately 15 per cent to the height of the double acting engine, with a corresponding increase in cost of from 10 to 12 per cent. Against this, however, we have a power output from 80 to 90 per cent greater than that of the single acting engine, so that, reduced to a hp. basis, both the weight and cost of the double acting type is at least 40 per cent lower than that of the former.

Analyzing the matter from the basis of a given capacity, it follows that for the same number of cylinders and piston speed the area of the double acting cylinder reduces to about 0.55 that of the single acting cylinder (inverse ratio of d.a. to s.a. cylinder capacity of fixed bore and stroke); increasing this figure 10 to 15 per cent to make allowance for the additions to the lower end of the double acting cylinder gives a fair approximation to the relative weight and cost of a double acting engine as compared to a single acting one of equal capacity.

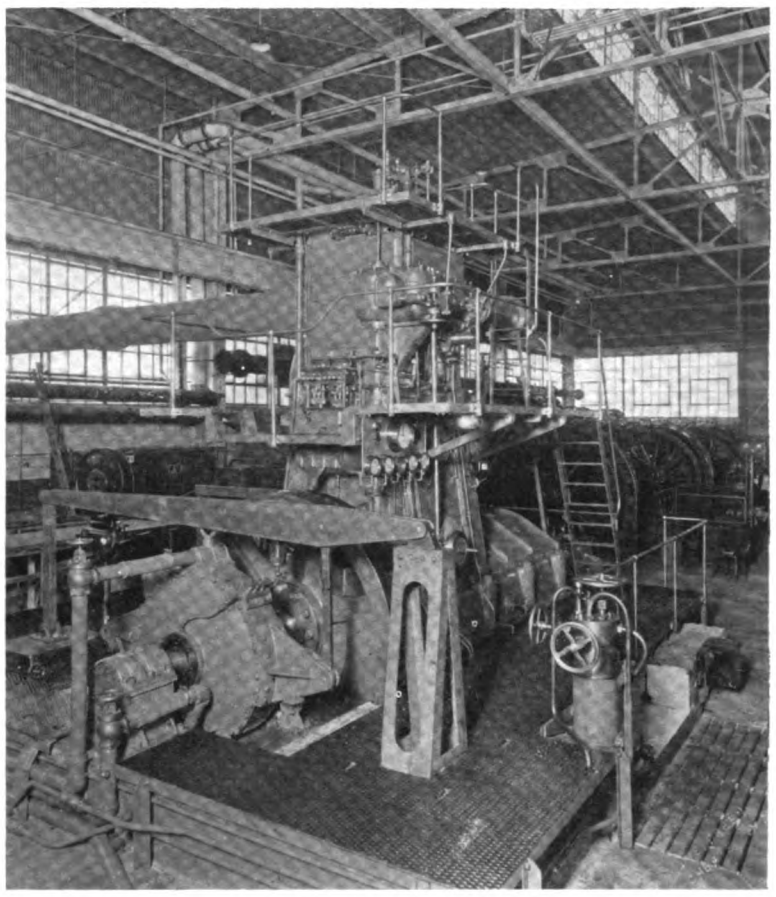
In actual practice the cylinder bore of the double acting engine would hardly be arrived at by the above method of reasoning, since in most cases the resulting stroke to bore ratio would be too unfavorable for the most effective proportioning of the exhaust and scavenging ports. The stroke would be made somewhat shorter, with a corresponding increase in cylinder bore to a ratio best suited for the given rotative speed. Shortening of the stroke decreases the engine height, but the accompanying weight reduction is usually offset some-

(*Continued on page* 423)

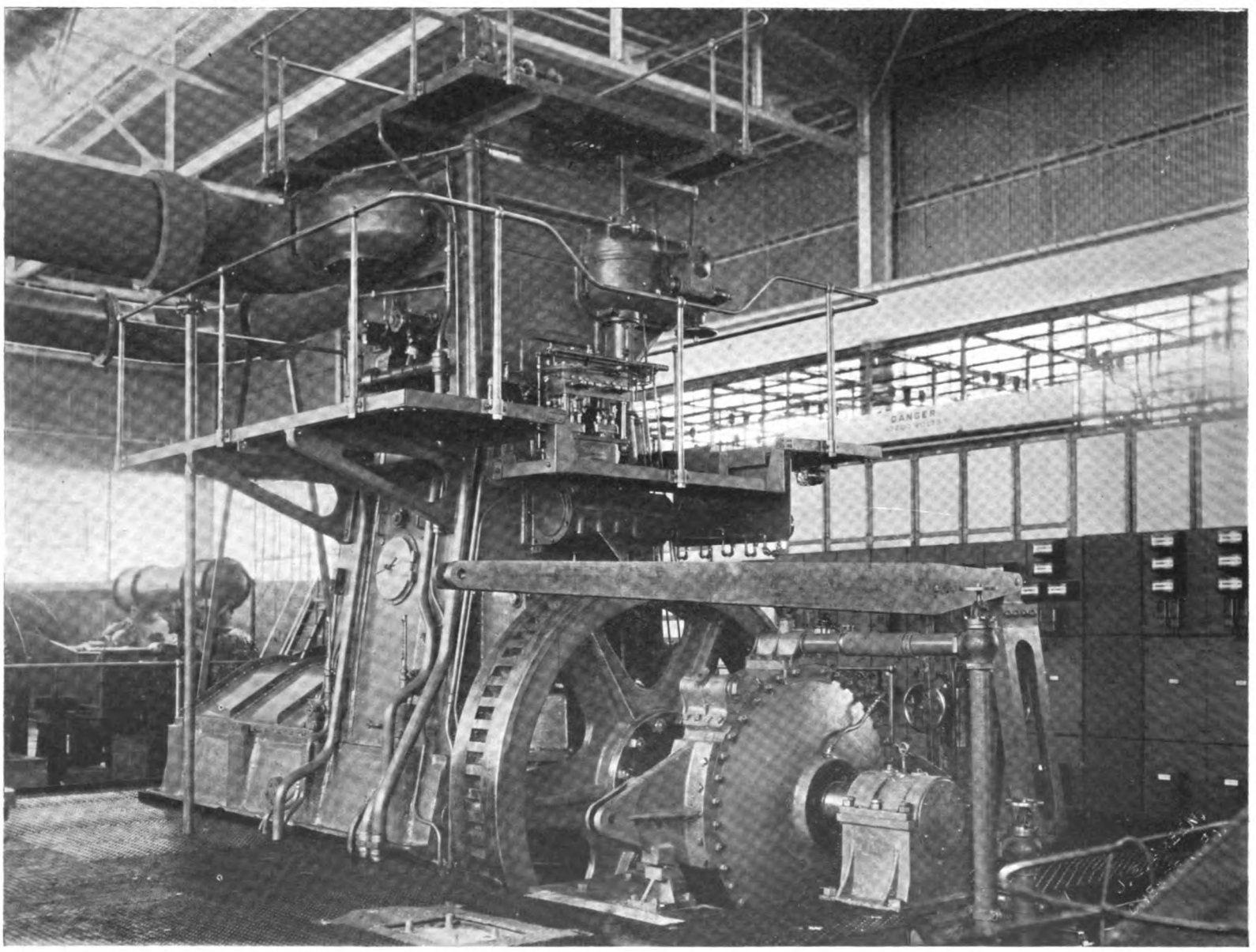
* Consulting Maine Diesel engineer.



The new engine is compact in layout, absorbing very little headroom



Bedplate of experimental unit designed for more cylinder units



The Sun-Setz double-acting 2-cycle Diesel, after exhaustive shop tests, is now ready for production in multi cylinder units

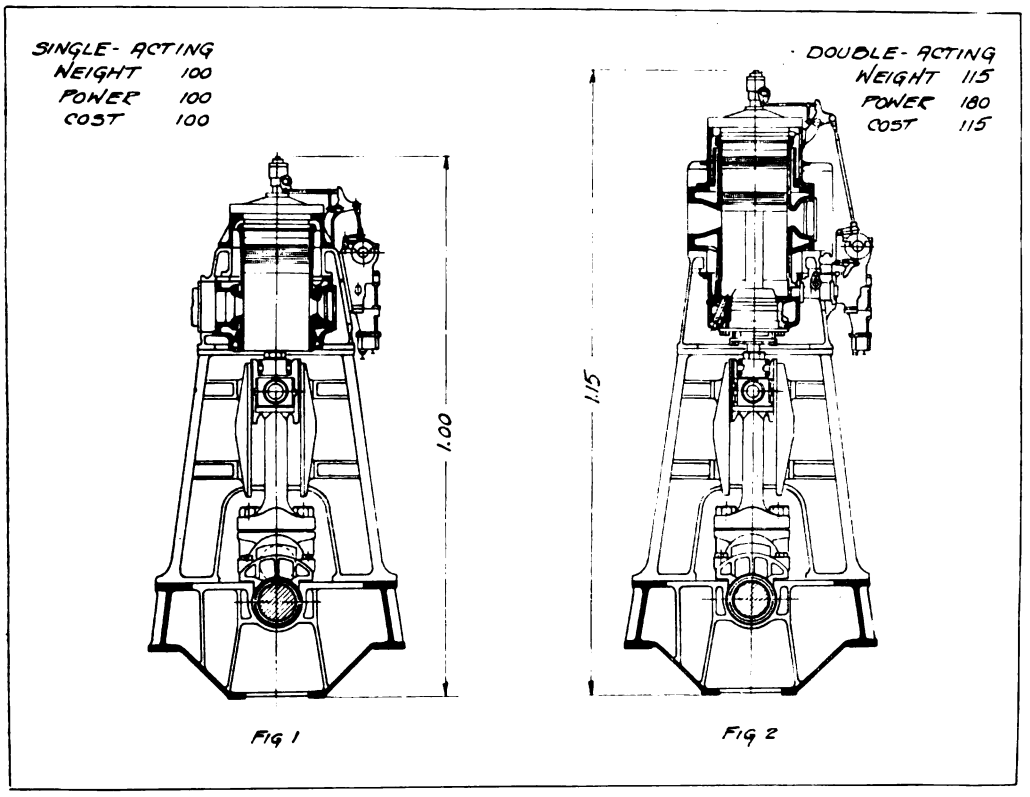


FIG 1 FIG 2

(*Continued from page* 417)

what by the heavier proportioning of the parts that becomes necessary with the increased cylinder bore. Making allowance also for the fact that the cost of machining decreases at a somewhat lesser ratio than the weight of similar parts (at least with the bigger pieces where setting up is an appreciable cost item), there still remains a considerable margin between the cost of a double acting and that of a single acting engine of the same capacity.

In view of the foregoing conclusions it may be considered reasonable to expect the cost of producing a Diesel engine of double-acting type to fall below that of producing one in the single-acting form, if the latter is of the crosshead type.

The tabulation here attached of five different types of engines of a capacity of 750 s.hp. at 180 r.p.m. affords a good illustration of the relative position of each type. Some of these engines are being regularly built at the present time, and all of them are proportioned to meet the given conditions in accordance to the most accepted practice in their respective class. This tabulation brings out the advantages of the double-acting engine not only from the immediately commercial point of view (reduced length and weight), but also indicates its superior operating qualities as expressed by the smaller cylinder bore, the moderate piston speed and the conservative M.I.P. rating.

From the foregoing it is evident that a double-acting 2-cycle, 3-cylinder engine of 750 s.hp. capacity is a size which still permits realizing all the advantages of the double-acting form. This particular engine is designed to meet operating conditions which demand as careful a constructional treatment as a large engine; the benefit of a comparatively small cylinder bore, as far as heat stresses are concerned, is offset by a comparatively high rotative speed, resulting in a frequency of heat impulses, and thereby an intensity of heat effect upon cylinder and piston walls, which approximate those of larger but slower speed engines. All the parts subjected to these heat effects have accordingly been given a constructional form which is directly applicable, and establishes a precedent, for engines of any size.

Since marine service imposes the most severe operating conditions known in commercial oil engine practice, the design of this engine has been carried through with these conditions foremost in mind, it being a matter of repeated observation that an oil engine that can stand the hard tests of such service always makes a most acceptable stationary unit, while the reverse is rarely true. The advantages of the double-acting engine pointed out above permit to incorporate in it all the constructional refinements that make for immunity against the effects of severe operation without the risk of excessive cost which now often compels designers of single-acting engines to make concessions against their better technical judgment.

The foremost requirements of marine service naturally are absolute Reliability and Durability under continuous heavy loads, under the most severe stress of weather, with an operating crew that may lack methodical training (and is often hampered in a methodical routine by managerial shortsightedness), where confined space and poor lighting greatly reduce ease of attendance, where facilities and technical assistance are never more than meager to meet emergencies, where the engine is mounted on a foundation that lacks rigidity and is continuously in motion with the force of gravity acting through constantly changing angles, where moisture of sea air is an ever present corrosive agent which readily precipitates, and where water with varying degrees of acidity and alkalinity causes destructive galvanic action between dissimilar metals.

With the foregoing thoughts as a basis, the Sun two-cycle, double-acting oil engine was conceived to embody the original ideas of the inventor and those who have followed him and represents the culmination of over twenty years of personal association with Diesel and oil engine construction in the United States and Europe; its constructional features have stood the test of extended practical application, and are incorporated in this engine on account of their peculiar fitness to meet the larger requirements of American manufacturing and operating conditions.

The engine is of the modern port-scavenging type, which by logical adaptation of automatic port control valves and improved port formation lends itself particularly to the double-acting construction, thereby making it adapted to units of large capacity and unsurpassed simplicity.

For a given output this engine requires fewer and smaller cylinders than any engine now built in the United States, except 2-cycle double-acting types; for this reason its length and weight is from 25 per cent to 30 per cent less than that of 2-cycle, single-acting engines, and from 50 per cent to 60 per cent less than that of the 4-cycle, single-acting type of the same capacity and speed of rotation. The relative costs of production stand in about the same ratio.

The amount of labor involved in the manufacture of this engine is from 30 per cent to 50 per cent less than that of the engines now currently produced in the United States; this saving is due mostly to a reduction of the expensive assembly and erection work (skilled hand work) thus materially shortening the time one of these engines remains in the shop.

With the exception of slight variations in the control gear the construction of the engine is completely standardized to meet with equal facility the requirements of stationary as well as marine operation; for either service it excels in uniformity of torque, balance, freedom from vibration and readiness to start from any position with fewer cylinders. An unusually wide range of capacities can therefore be covered with one cylinder size at a minimum investment for patterns, tools, and fixtures.

Only net working loads are transmitted to the crankshaft, the positive and negative inertia forces of the reciprocating parts being either produced or cushioned directly by the gas pressures in each cylinder; each connecting rod transmits two power impulses to every crank in one revolution, which makes a 3-cylinder, double-acting engine equivalent to a 6-cylinder, 2-cycle, single-acting, or one of 12 cylinders in the 4-cycle, single-acting type for practically the same uniformity of torque.

The smaller and fewer bearings and other rubbing surfaces perceptibly reduce friction work as compared to other Diesel engines of the same capacity, and its lubricating oil consumption is correspondingly less; as a marine engine its shorter length renders it less susceptible to the unavoidable elastic deformations of the hull, and therefore less likely to develop bearing trouble.

Effective lubrication is facilitated by virtue of the fact that the pressure on all main bearings, crank and crosshead pin boxes and guides reverses at least twice in every revolution; contamination of lubricating oil in the crank bilge by residues from the engine cylinders is precluded by an additional stuffing box in a

Types of Diesel Engine of 750 B.hp. Capacity at 180 R.p.m.

Type	4 cycle S. A. Trunk	4 cycle S.A. x Head	2 cycle S.A. x Head	2 cycle S.A. x Head	2 cycle D.A. x Head
Number of cylinders	6	4	4	3	3
Bore x Stroke, in.	19x25	23x23	17x27	20¾x26	16x22
Piston speed, ft./Min.	750	840	810	780	660
Mechanical Efficiency	.75	.75	.70	.70	.775
Mean ind. press., #/sq. in.	98.5	95.0	96.0	90.0	85.0
Length overall, including flywheel	29 ft. 6 in.	23 ft. 6 in.	24 ft. 6 in.	26 ft. 6 in.	20 ft. 0 in.
Height shaft center to engine top	12 ft. 0 in.	17 ft. 0 in.	14 ft. 3 in.	17 ft. 3 in.	12 ft. 3 in.
Weight complete, incl. flywheel lb.	220,000	280,000	190,000	250,000	135,000
lbs./hp.	295	374	254	333	180
Crankshaft diameter	11½in.	13¼ in.	10½ in.	12 in.	10¼ in.

suitably fitted diaphragm below the main stuffing box.

Owing to the advantageous method of scavenging used in this engine the same row of scavenging and exhaust ports serves both the upper and lower cylinder end; this results in an ideally simple cylinder construction, and reduces the length of both the cylinder and piston to the lowest possible minimum, thus reducing inertia forces.

The cylinder liners as well as the jacket walls are entirely relieved from longitudinal stresses, those resulting from gas pressures as well as from the effects of temperature variations. The cylinder liners being always under compression, their wall thickness can be greatly reduced which, together with intense cooling by direct water circulation over their entire length, promotes effective cooling of both liners and piston rings, and good lubrication.

Absolute freedom from variations in the length of the cylinder permits the valves in both the upper and lower cylinder end to be operated from the same camshaft without danger of erratic operation due to changes in the valve gear clearances; operation of all the valves from a single camshaft is enhanced by the method of fuel injection in the lower cylinder end which requires only one fuel valve. A valve gear of unusual simplicity can thus be resorted to.

The elimination of dangerous stresses in the cylinder heads is safeguarded by a form which promotes ease of molding and soundness of castings, freedom from excessive initial casting strains, and uniform wall sections; their construction is such as to avoid bending stresses when bolted up, and the flow of cooling water is positively directed over the essential wall surfaces.

The piston construction comprises only three parts, all of them of such form as to permit the use of thin walls and effective water cooling over the entire length, including the piston ring seats; all joints are provided with double protection against corrosion, rusting and leaks.

Both ends of the cylinder can be readily opened up for inspection, and the piston can be removed with equal facility from above or below.

Starting and reversing of the engine is facilitated by means of a timed compression relief valve (operative in the neutral as well as starting position), which conduces to low starting air pressures and economical use of starting air; this feature not only simplifies the auxiliary apparatus needed with every Diesel engine, but it adds to the safety of operation in precluding any high terperature gases passing from the engine cylinders to the starting air receiver.

The effectiveness of the scavenging process with its attendant low scavenging air pressure together with the high mechanical efficiency due to its few and comparatively small parts, guarantee a fuel consumption equal to or better than the most efficient Diesel engines known today.

This engine makes good type for converting existing steamers into motorships; it will never require more than about two-thirds the space of the most compact steam equipment of equal capacity.

In a subsequent article are described more in detail some of the constructional features of the engines as well as giving the results of various tests.

(Part II of this article will be published in the June MOTORSHIP)

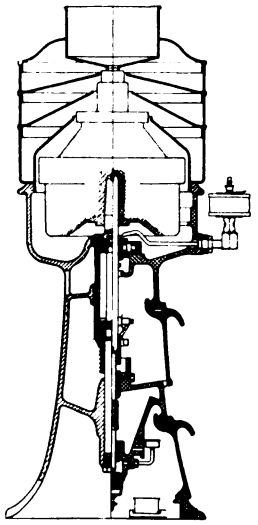
A Ball-Bearing Centrifuge

TWO well known Swedish motorships —the Grangesburg-Oxelosund Co.'s LULEA and the Transatlantic Co.'s INNAREN have been fitted with the Baltic centrifugal separator and ten more have been ordered by shipyards for vessels building. This machine contains a number of novel features and we draw attention to it, if only to emphasize the high state of design efficiency which competition in the centrifuge field is bringing about.

The separator in the Baltic machine consists of a cast-iron frame with a vertical spindle (ball-bearing spindle), and a horizontal shaft (worm wheel shaft). The ball-bearing spindle carries the centrifugal bowl and the worm wheel shaft, which is also running in two ball-bearings, is driven by the power unit. The power is transmitted from the wormwheel shaft to the ball-bearing spindle through a wormwheel and a worm, which are lubricated automatically by an oil bath in the bottom of the frame. Around the upper portion of the centrifugal bowl are located three receptacles, of which the two lower ones receive the separated liquids discharging from the bowl, while the upper one is a kind of overflow or so-called signal receptacle. The latter comes into operation if the centrifugal bowl should get choked by sludge or such like, and also serves as a warning when the bowl needs cleaning. Above the top receptacle there is a feed cover provided with a strainer through which the liquid to be separated passes into the centrifugal bowl. Each one of the aforesaid receptacles is provided with an outlet spout, whose opening can be turned in any direction required.

The separator is equipped with two brakes with interchangeable brake faces, by which the machine can be stopped very rapidly. It is furthermore equipped with a revolution counter whose movable parts are only immeshed when the speed counter is in use, connecting and disconnecting taking place quite automatically.

The separator is either arranged for electric drive with the motor placed on a bracket on the separator frame, or for belt drive from an overhead shaft. In the latter case the machine is provided with fast and loose pulley fitted either direct on the separator's driving shaft or on a separate counter gear. In the case of electric drive all types are equipped with a motor



The Baltic type centrifuge

mounted on an adjustable bracket and a special friction clutch, so that the motor can be started up with an ordinary starter. The clutch brings the bowl automatically and gradually up to its full speed without overloading the motor. The power is transmitted from the horizontal driving shaft to the bowl spindle by a wormgear. The frame in all sizes is equilateral, and propulsion can therefore take place on that side which is most suitable for fitting up.

All flexible bearings, bushings and thrust bearings appertaining to a spindle in a separator with journal bearings are replaced by two SKF ball-bearings, encased in a practically hermetically sealed housing, which forms an absolute protection against the penetration of every impurity.

By reason of the small oil consumption drip lubricators are unnecessary. The few drips necessary per day in continuous drive are given to the bearings by a single hand grip on a pump-lubricator mounted on the machine.

The driving shaft is provided with two SKF ball-bearings, which are embedded in ball-bearing grease and completely protected against every possibility of fouling. The ball-bearing grease, which is forced into the bearing housings by means of a grease-gun, lasts for a long time.

This illustration demonstrates the difference between a Baltic oil purifier with ball-bearings and an ordinary oil separator with journal bearings.

Contracts Awarded for New Dredge

Bids were opened on April 10 for machinery and power equipment for a new Diesel powered hydraulic dredge, to be owned by the New York State Department of Public Works. The Lombard Governor Co., of Ashland, Mass., were the successful bidders for the Diesel. Their bid was $55,000 for a 500 b.hp. Diesel engine direct connected to a 15-inch centrifugal dredging pump and one 150-b.hp. Diesel engine direct connected to 100 kw. generator and auxiliary equipment. The estimated cost was $62,000. The American Hoist and Derrick Co., St. Paul, Minn., were the successful bidders for the motor driven hoist at $4,346.00.

Six Motorships for Dutch Line

Another ambitious step in the motorization of the world's shipping has been taken by the Koninklyke Paketvaart Maatschappij of Amsterdam, when they placed an order with a prominent shipbuilding company of Holland for six cargo motorships, each of which will be 165 ft. x 28 ft. x 10 ft. draft and will be powered with Sulzer Diesels.

Contracts Let for Lightships

The Bureau of Lighthouse Service has ordered three electrically-driven lightships. One is for the west coast and two for the east coast of the United States.

These three ships will be built by the Albina Marine and Iron Works of Portland, Ore.

The Diesels of the Large Panama Canal Dredge

Four-cycle Fulton Engines of Special Design Have Just Passed Rigid Inspection Tests Prior to Installation

FOUR 911 hp. Fulton Diesels will make up the main power plant for the newest and largest Panama Canal dredge, LAS CRUCES, now being built by the Ellicott Machine Corporation, 1111 Bush Street, Baltimore, Maryland, for the Panama service. These engine will be 8-cylinder, 4-cycle, single acting, trunk piston, air injection units.

The engine cylinders will be 17½ in. by 24½ in. and the engines will operate at 204 r.p.m. Each engine will be direct connected to one main and one auxiliary direct current Westinghouse generator, both generator armatures being mounted on a common shaft.

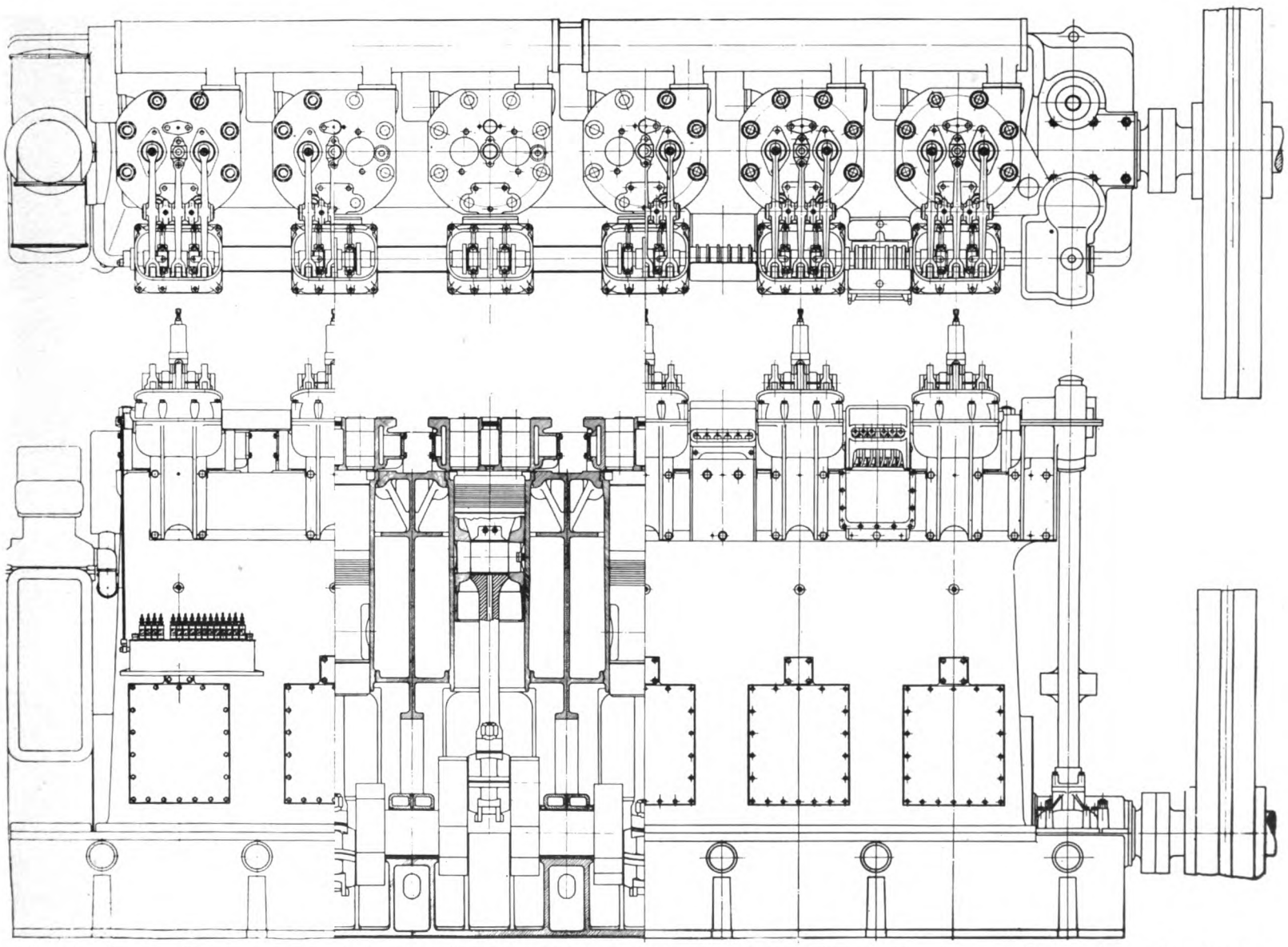
Fulton's new enbloc frame construction will be used in the engines. For this type of frame construction, it is claimed that with medium weight a great rigidity, unobtainable with the A or Box frame, is secured, particularly adapting the engines to dredge and marine service.

The bedplate of these engines is exceedingly rigid, having box sections under the bearings, where the principal forces are transmitted, and the enbloc frame reaches from the center of the crankshaft to the bottom of the cylinder head. The cylinder liners are cooled over their entire length and are suspended in the frame so that they are free to expand longitudinally. All working parts are totally enclosed and protected from dust and dirt, and leakage of oil is prevented; also, an ideal transmission of the forces of combustion from the cylinder heads to the bedplate is secured.

Large crank case doors furnish ready access to the bearings and openings are provided to flush out the water jackets. The enbloc frame serves only for the working cylinder; the compressor frame is a separate casting. These engines are furnished with two-piece, forged crankshafts, each piece accommodating four cranks.

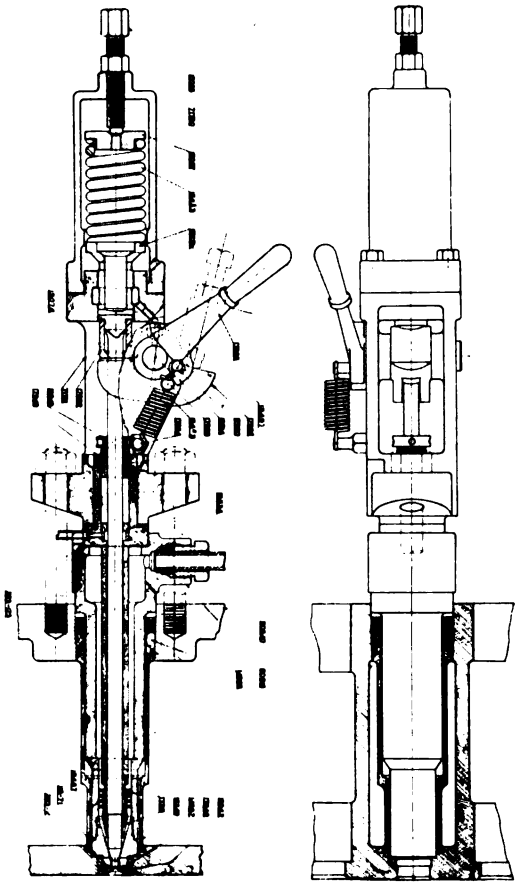
What is claimed as a marked improvement over the ordinary bearing construction is used, the conventional cast iron bearing shells being omitted, and in their place are heavy babbitt shells, which rest directly in the bedplate. These shells are prevented from rotating by the bearing caps. The advantages claimed for the loose babbitt shells are that the babbitt has practically 100 per cent contact with the surface supporting it and that the babbitt can freely expand while the engine is running, as it is not hindered by dovetails. This accounts for the complete absence of cracking of the shells. The Fulton Company states that to its knowledge no shell has ever cracked and the bearings are nearly indestructible after they are placed in the bedplate. It is further claimed that the heat is better dissipated into the bedplate and surrounding air if the cast iron shells are omitted, and that the loose babbitt shells are more easily removed than the cast iron ones, which may rust tight to the bedplates.

Only bearings of secondary importance have the babbitt anchored by dovetails. The ends of the bearing caps at the center of the engine are machined to accommodate two horseshoe-

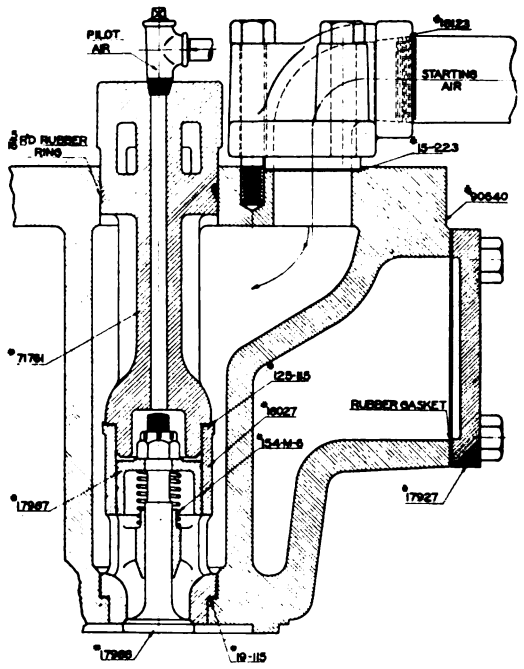


The 8-cylinder enbloc-construction Fulton Diesel develops 911 hp. at 204 r.p.m. Four of these units will power the big dredge Las Cruces

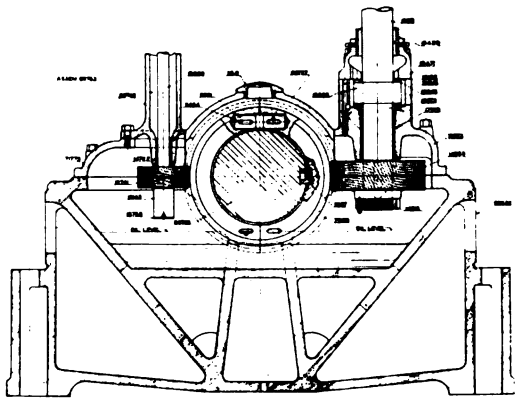
Details of the Fulton Marine Diesel Engine



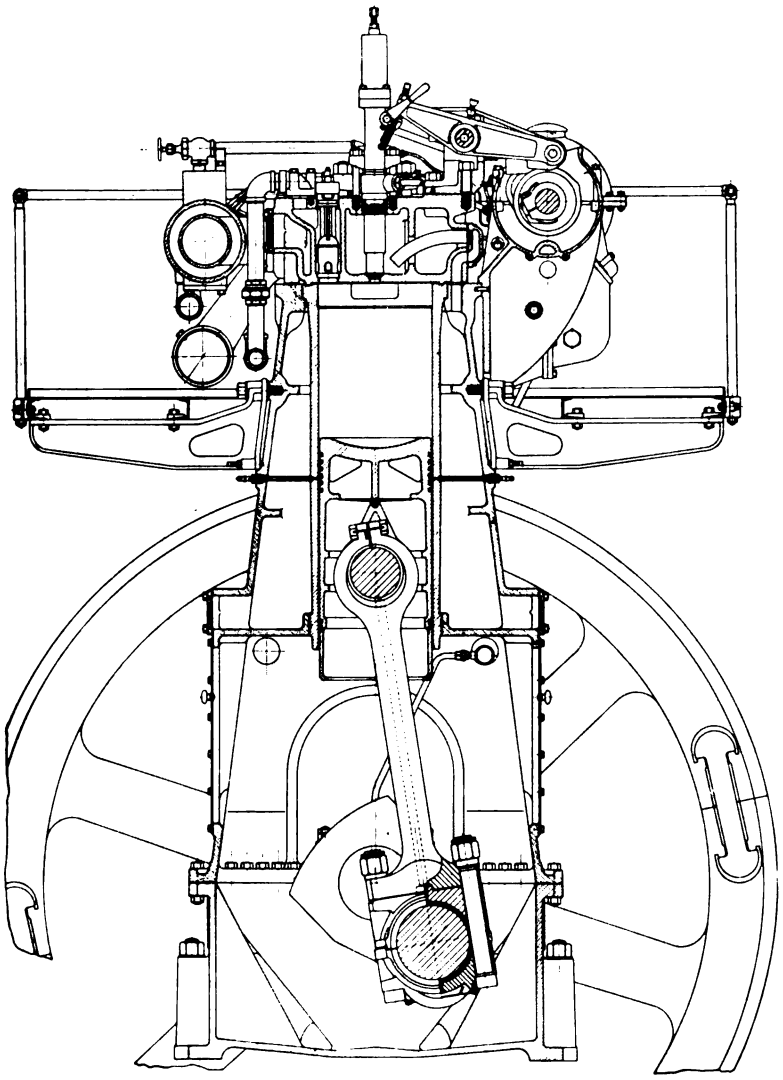
Details of fuel valve



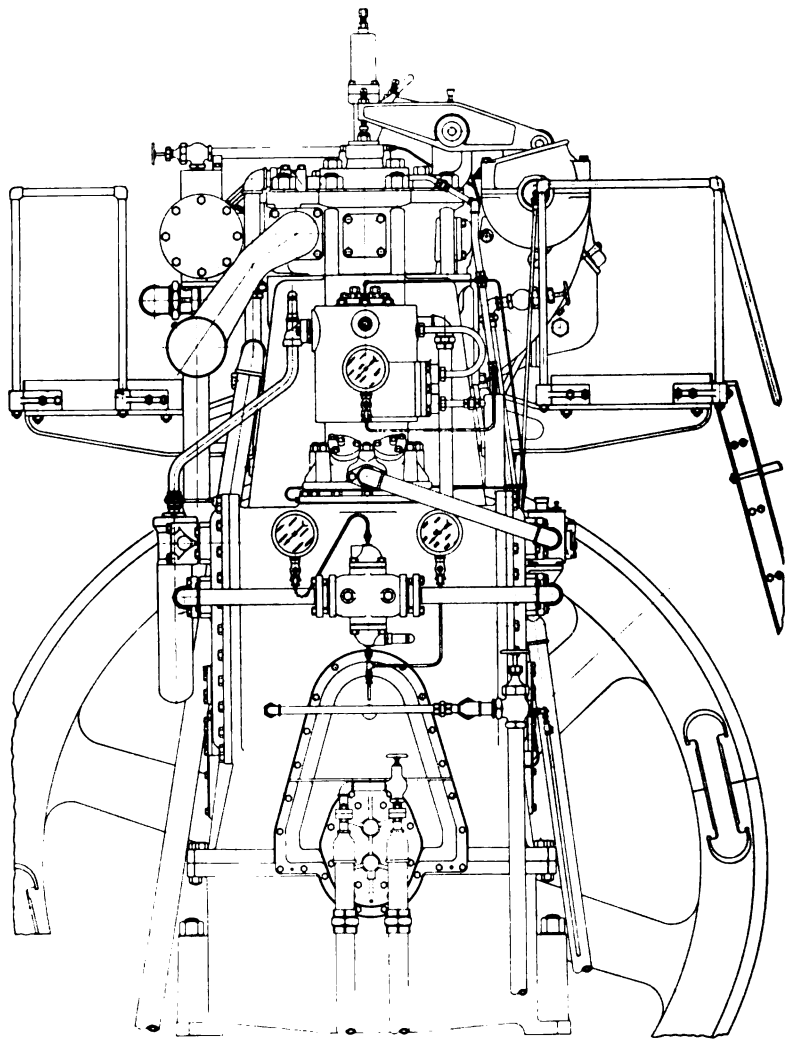
Details and position of starting air valve



Camshaft and governor drive



Cross section through engine, showing valve and cylinder head arrangement



End view of engine looking on injection air compressor

shaped bronze thrust rings. These rings can be conveniently shimmed up and readjusted.

The design of the connecting rod shows both halves of the crank box are made of steel castings. As these halves align each other, the bolts have a 1/16 in. clearance in the box. This design facilitates assembling as the bolts need not be driven into the box, and also eliminates the bending stresses to which body bound bolts are subject and which have frequently been the cause of crankpin box bolt failures.

In the Fulton-Diesels extra high and castellated nuts with cotter pins passing through them are used for crankpins.

In the connecting rod, the lower as well as the upper babbitt bushings are loose in the rod, and are prevented from rotating by shims. The upper end of the rod is split to facilitate installation and removal of the bushing. The piston and its head are cast integral. A diaphragm prevents oil from being splashed into the cylinder head. Six narrow compression rings and one oil ring are used on each piston.

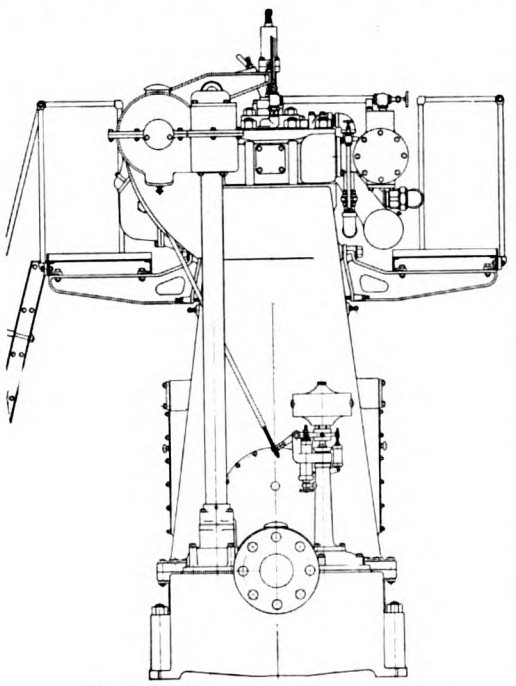
Valves of the Fulton-Diesel follow the customary design. The valve head is made of cast iron. The inlet valve is identical with the exhaust valve with the exception that water cooling of the valve cage is omitted. The design of the exhaust valve is such, however, that it may be used as a substitute for the inlet valve should the occasion ever arise.

The fuel injection valves are housed in a water jacket which is a part of the cylinder head. This jacket leaves a large water passage between the inlet and exhaust valve. In order to secure a rapid flow through these water passages, the water enters the cylinder head through a pipe which directs all the water toward the center of the cylinder head. This effectively cools the center part, where the heat is the greatest.

The injection valve atomizer is of the standard plate design. Fuel enters the sleeve just below the stuffing box. This design insures permanent and automatic lubrication of the stuffing box, providing its gland is kept sufficiently loose to allow a few drops per minute to pass through.

After entering the valve, fuel oil passes downward through the ring space between the needle and its guide bushing and out through a number of small drillings in the lower end of said bushing. This uniformly distributes the fuel oil over the atomizer plate.

An arrangement whereby the needle valve can be reduced by one-half its normal lift, is accomplished by turning a hand lever, which lowers the fulcrum of the lever operating the needle. This facilitates the starting and stopping of the engine. Cast iron is used in the needles. A low pressure starting system is used on these engines, the pressure not exceeding 250 lb. per sq. in. When the starting air tank is open, the starting air acts on the valve head and on the piston which is fastened to the end of the valve stem. As the piston area is greater than that of the valve, the tendency is for the air to hold the valve firmly seated. The starting valve will open when compressed air is permitted to enter from above and to act on the upper side of the piston. The air for opening the valve is taken from the starting air header and is timed by the pilot valve. With this arrangement, the actual opening of the starting valve would take place when the pressure in the working cylinder, during the expansion stroke, is slightly below the pressure of the starting air.



Camshaft and governor drive

Back blowing from the power cylinder into the starting air system is prevented, and a possibility of explosion of the starting air system is eliminated.

The vertical shaft is driven by helical gears, and it in turn drives the camshaft and indicator drive to the same type of gearing. Each cylinder has its individual cam and camshaft housing, in which two different oil levels are maintained. These oil levels are just high enough to permit the cam noses to dip into the oil, sufficiently to lubricate the camshaft bearing. None whatsoever is splashed over the housings.

The fuel cams are arranged so that they may be adjusted individually in order that they may be properly timed. The rim of the camshaft gear may be shifted on its hub, a convenience that permits adjustment of all cams collectively if the gear teeth become worn, causing the camshaft to lag behind its original setting.

Each cylinder has an individual fuel pump, timed by a separate cam. The pump works on a constant stroke principle, by-passing some of the fuel during the first part of the discharge stroke. The pump has ample capacity so that the engines may carry from 25 to 30 per cent overload. The pump body is made of a forged steel block and plungers of hardened steel are lapped into hard steel liners.

An important feature of these engines is the fact that the pump sets in a trough filled with oil. The oil level on the pump is determined by an overflow cock located at a height above the plungers and below the adjusting screws of the by-pass levers. The lower part of the pump is submerged in oil, which permanently lubricates it and prevents air from entering the pump, causing it to become air bound.

The governors are of the Jahn's type. They are located on the bedplate of the engines at the flywheel end and are driven through a spring coupling by means of helical gears from the crankshaft.

The compressor is of the 3-stage double acting type. The low and intermediate pistons are cast integral, while the high pressure piston is of the self-aligning type. All liners, including the high pressure ones, may be removed and replaced. The plate valves are used on the low and intermediate stage and mushroom type valves on the high pressure stage. Particular care has been exercised to avoid concealed flanges or screwed connections in the whole compressor. If any of these connections should leak, it would be noted from the outside and could be tightened while the engine was running.

A force feed lubricating system is used, which is a gear pump driven by a drag crank from the compressor crankpin. Lubricating oil draining from the crank case through a strainer and collecting in a sump tank is lifted by the pump and forced through a cooler into the distributing header. This header is located inside the frame, and all bearings are continually supplied with an abundance of oil.

These four engines for the Panama Canal dredge have now completed their factory test. Our illustration shows one on the test block, direct connected to its two generators, at the works of the Fulton Iron Works Company, in St. Louis. The power generated is taken up by the water rheostats shown to one side. All of the engines easily passed the rigid Government inspection.

Diesel Tanker for West India Oil Company

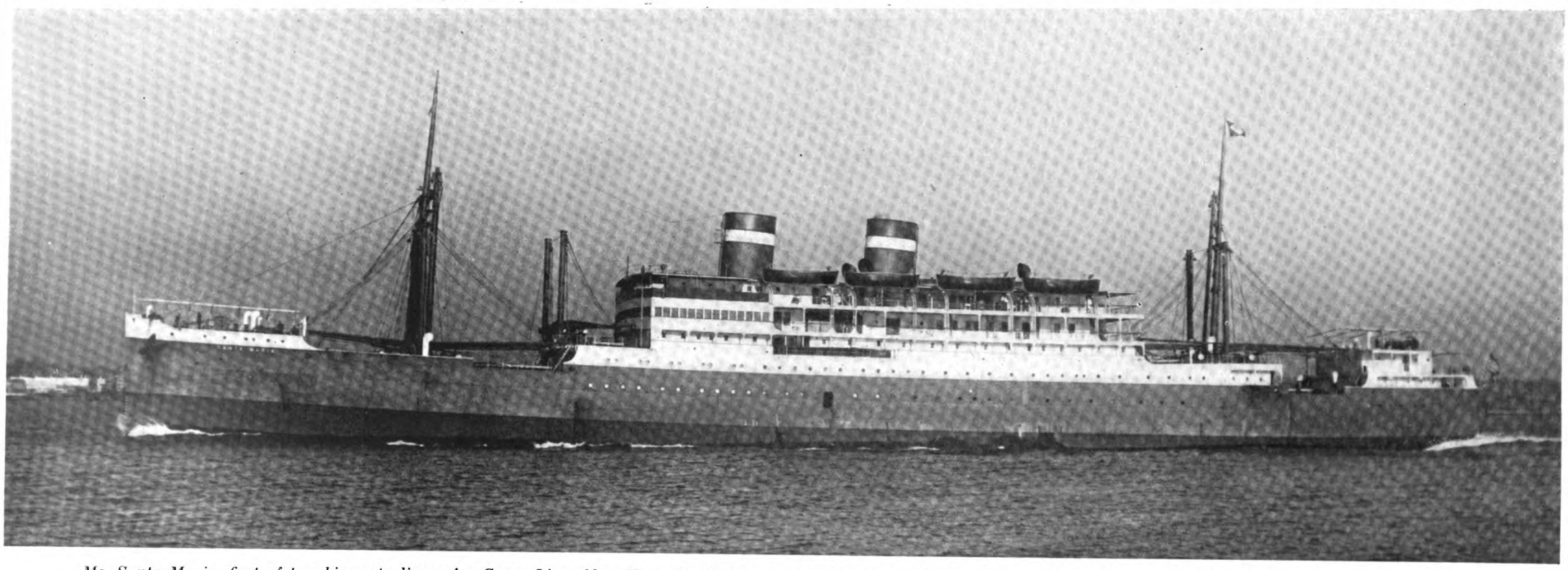
THE use of Diesel engines for small tankers has become quite general during the past few years as the economy of this type of engine is as important for oil companies as other types of shipping. When distribution of bulk oils became an important factor in commerce, the tank barge towed by other power became a general practice. Later gasoline and kerosene engines were installed in the tank barges, thus making them self-propelled barges.

Increasingly larger cargoes of oils eventually brought out the tank ship design which is a distinct type in its own. The increasing cost of refined oils with the attendant fire risk encountered in transporting such oils has placed certain limitations on the use of electrically ignited engines. With the development of the Diesel engine in moderate powers and of established economy and reliability of this type of prime mover, the Diesel engine naturally fitted into the power needs of all classes of tank vessels. The use of Diesel engines for this purpose has made exceptionally rapid progress during the past few years and there is now a considerable fleet of tankers both in this country and abroad. In May of last year, the Buenos Aires office of the Fairbanks Morse Company completed the installation of a six-cylinder 180 hp. engine in the oil tanker PETRACTO, which is owned and operated by the West India Oil Co. of Buenos Aires. The vessel carries gasoline, kerosene, and fuel or crude oils in bulk and maintains a regular service between the ports of Buenos Aires, Campana, Zarate, Rosario, Santa Fe and Montevideo. She is 165 feet long and has an overall breadth and depth of 30 feet and 7 feet, respectively. She was built in San Fernando, Argentina, in 1916 and has a capacity of 570 tons of fuel oil. This load is distributed in 10 water tight tanks or compartments. She averages about eight miles per hour with her engine turning 360 r.p.m. and driving a 52-inch propeller. She was formerly a tank barge and was towed over the same route that she now covers under her own power, hence a great saving in towing expense is apparent, due entirely to the safety and reliability and economy of the Diesel engine.

W. India Oil Co.'s tanker Petracto

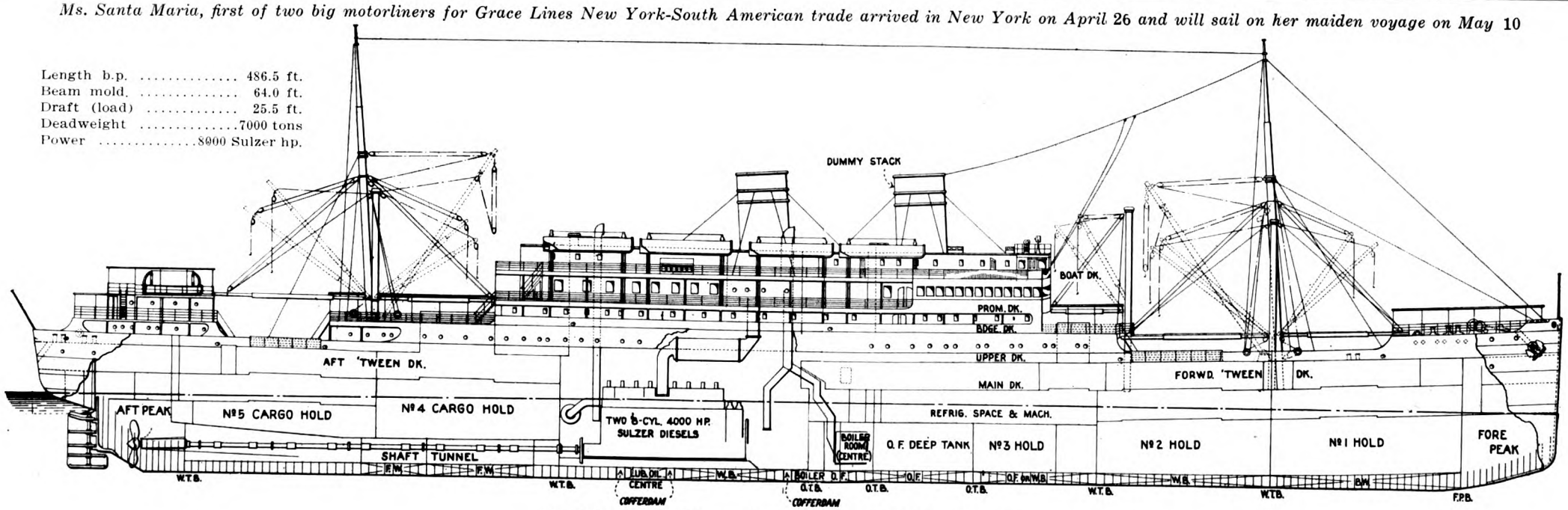
American-owned Motorships from a British Shipyard

Two fine passenger liners for the Grace Line building at the Haverton Hill plant of the Furness Sb. Co.



Ms. Santa Maria, first of two big motorliners for Grace Lines New York-South American trade arrived in New York on April 26 and will sail on her maiden voyage on May 10

Length b.p. ..... 486.5 ft.
Beam mold. ..... 64.0 ft.
Draft (load) ..... 25.5 ft.
Deadweight .....7000 tons
Power .....8900 Sulzer hp.



See Motorship, November, 1927, for full Description

A New Round-the-World Motor Freighter

Barber Lines' Latest Vessel Inaugurates Fast Freight Service to Orient from New York with New Ms. Greystoke Castle

ONE of the most recent additions to the fleet of Motorships engaged in round-the-world service is the freighter GREYSTOKE CASTLE, owned by James Chambers & Co. of Liverpool, operated by the Barber Lines on their service from New York to the Far East via Panama. She recently completed a transatlantic voyage from her builder's yard and loaded in New York for Shanghai and Manila. She was built by Cammell Laird and Co., Ltd., of Birkenhead and is one of two ships—a sister ship, the MUNCASTER CASTLE, is now completing and will take her maiden sailing on June 28.

The Greystoke Castle has a raking stem, elliptical stern, three steel telescopic masts and one funnel. There are two continuous steel decks, also a poop, long bridge and forecastle decks with a short, well between forward and aft. A cellular double bottom extends nearly all fore and aft, arranged in suitable tanks for the carriage of oil fuel or water ballast. The double bottom immediately below the propelling machinery is increased in depth and forms the seating for same, being specially stiffened for the purposes, and is arranged for the carriage of feed water at centre and oil fuel at sides. A cofferdam permits access to every holding down bolt of the main engine.

The fore and aft peaks are arranged as ballast tanks up to the main deck and store rooms above. Fore peak is suitable for carrying Latex. Amidships, between tank top and main deck, are fitted two deep oil-tight tanks, divided transversely by a cofferdam and arranged for the carriage of Latex or other cargo as desired. Also a large oil fuel tank is fitted in a tunnel between the vessel's two main propeller shafts.

There are eight watertight bulkheads, seven of which extend from tank top up to the bulkhead deck and the others to the main deck. These bulkheads divide the vessel off into 5 cargo holds and 5 'tween decks spaces and along with the long bridge 'tween deck spaces are fitted out for general cargoes. Tank top is ceiled below hatches and side sparring fitted to frames and bulkheads in portable cleats. Large hatches are fitted to these cargo spaces, those to No. 2 and 4 being particularly large. Open rails are fitted all round weather decks except in the wells and front of Lower Bridge which have plate bulwarks.

Characteristics of Greystoke Castle

Length overall	440 ft. 0 in.
Length b. p.	425 ft. 0 in.
Breadth moulded	56 ft. 0 in.
Depth moulded	31 ft. 9 in.

The accommodation for officers, engineers and crew is of a high class and quality not usually found in vessels of this type. Accommodation is provided for officers and engineers in steel houses on the bridge deck, captain and officers being at the forward end and the engineers abreast the engine casing aft. Captain and ship's office, two state rooms and smoking room are fitted out in steel house on lower bridge immediately above the steel house containing officers, steward, dining saloon and 4 staterooms.

Engineers are accommodated in cabins on both sides of engine casing together with electrician, stewards, cook, etc. A separate Mess Room provided for engineers with a pantry adjacent, fitted out with dressers, electric hot press, boiler etc. The Engineers rooms are fitted out in a similar high class manner as for the officers. Crew and petty officers and motormen are housed in the poop deck aft.

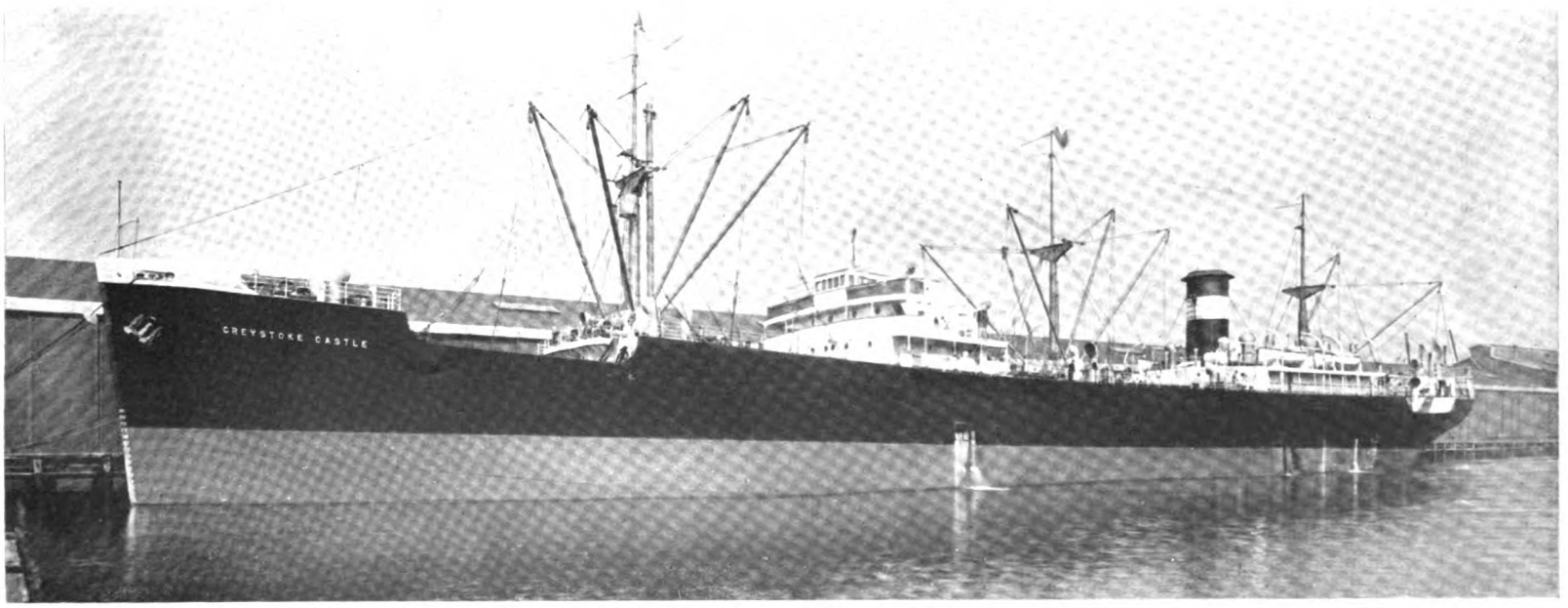
The European galley is situated at the forward end of engine casing and provided with large coal burning range, dressers, cupboards, etc. A large coal store for same is fitted immediately below the galley.

A native galley, hospital and steering gear house are arranged in a steel structure on the Poop Deck aft, which also contains the entrances to P. O.'s and seamen's spaces, aft.

The ship is heated by electric heaters in cabins, saloon and smokeroom and stoves in P. O.'s and crew's mess rooms aft.

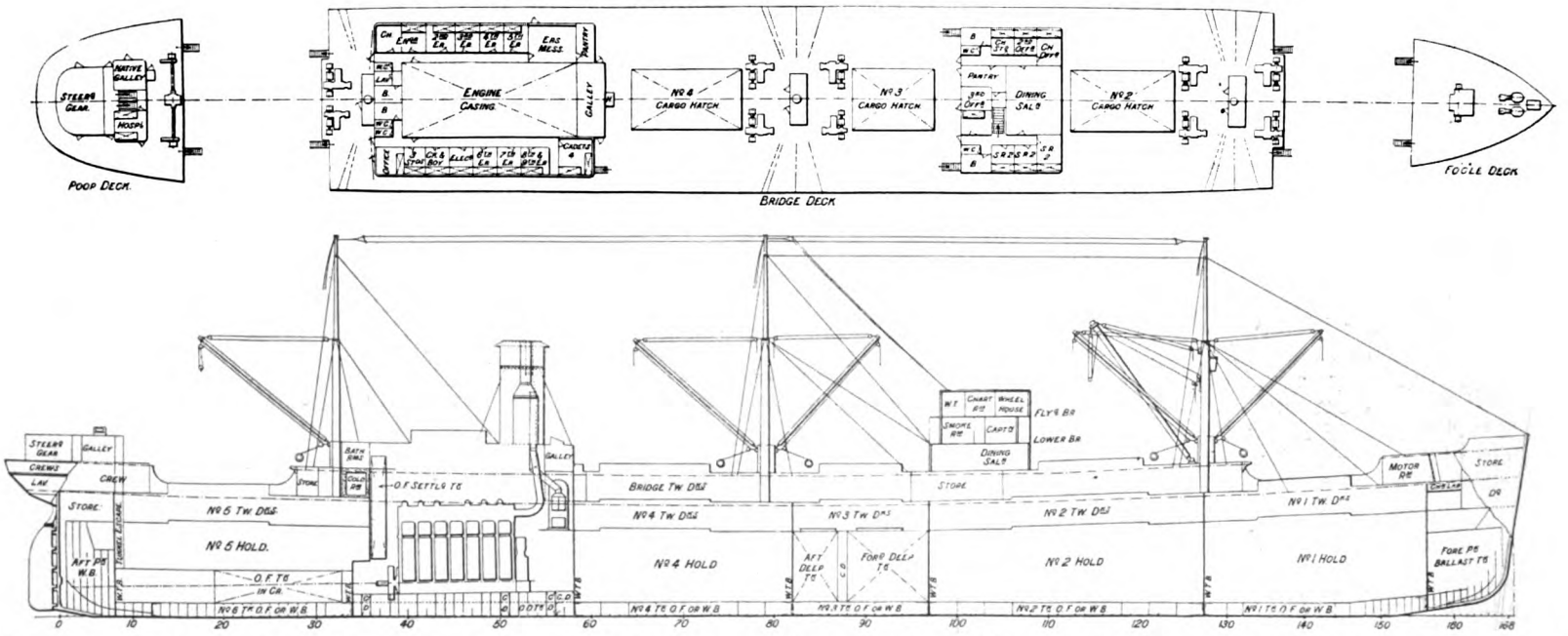
The deck machinery is of the most modern type and comprises electric-hydraulic steering gear, controlled by telemotor gear from flying bridge, electrically driven windlass on forecastle deck, motor being fitted in a watertight compartment below, and eleven electrically driven winches—there being eight 5 ton and two 3 ton cargo winches and one 5 ton warping winch.

The three masts of steel are arranged so that the upper portion will telescope into lower portion, so that the ship may pass under low bridges. Foremast is fitted with 5 steel 8 ton derricks, Main Mast with 3 steel 8 ton and two steel 5 ton derricks and the Mizzen Mast with two steel 8 ton derricks. The fore and main masts are also arranged for a 30 ton steel derrick but only one derrick is supplied. The cargo gear throughout is of the best

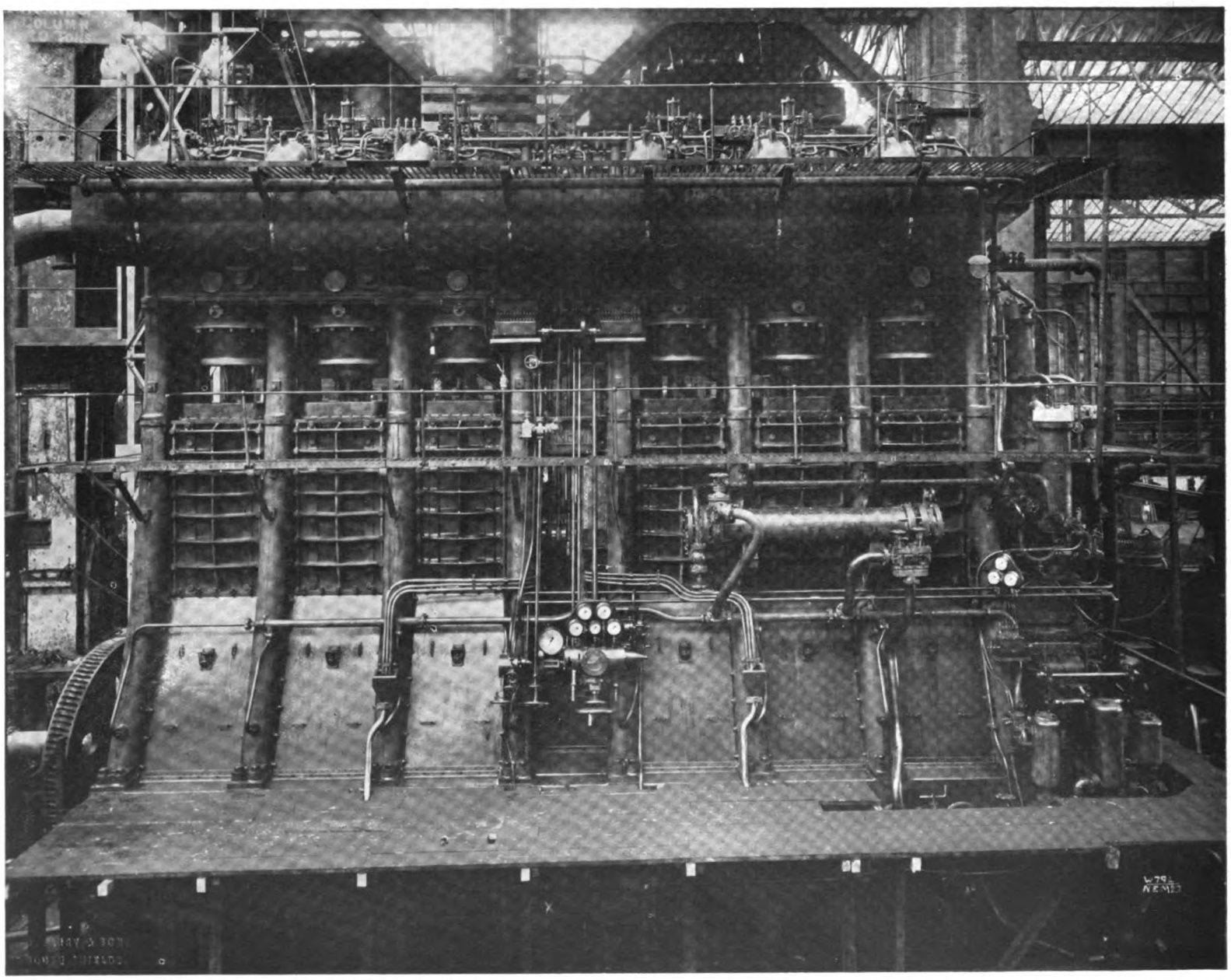


Ms. Greystoke Castle, the newest round-the-world freighter, sailed from New York on April 18 *in Barber Lines New York-Manila service. She makes Manila in* 40 *days and Shanghai in* 47 *days*

Two New Round-the-World Freighters



The Greystoke Castle and her sister ship the Muncaster Castle were built for the Lancashire Shipping Co., Ltd. (James Chambers & Co.), of Liverpool. They are especially designed for the carriage of Far East cargos to and from the United States. They are equipped with five holds and five 'tween decks spaces available for the proper handling of freight as well as the latest appliances for loading and unloading. Their construction is on the Isherwood combination system of framing



Two 6-cylinder 4-cycle North Eastern-Werkspoor single-acting Diesels are used for main propulsion. Each engine is about 2100 hp. at 103 r.p.m.

type and quality. Light steel poles are also fitted to the masts for supporting cargo clusters and flood lights, etc., for working at night.

A refrigerating installation comprising motor driven machine on the ammonia compression system is provided for cooling the insulated chambers consisting of a meat room and a vegetable room. The rooms are insulated with granulated cork retained by T. & G. boarding. The ship is electrically equipped throughout, current being supplied by means of four Diesel driven generators, which also provide the necessary current for the various auxiliaries, viz: winches, windlass, steering gear, refrigerating machine, heaters, etc.

A mechanical semaphore with electric Morse lamp on top is included in the equipment.

Four lifeboats class 1A type are fitted under davits immediately above the engineer's accommodation.

Two large store rooms are arranged for in the bridge 'tween decks one forward being for provisions and bonded goods and potatoes, the one aft being a large deck store with spaces off same for carpenter shop, refrigerating rooms, etc.

The Greystoke Castle is powered with a pair of 6 cylinder North-Eastern-Werkspoor engines, of the single-acting 4-cycle type, operating at a speed of 103 r.p.m. They have a b.hp. of 2100, and have a stroke of 59½ in. and a bore of 28¾ in. They are of the same type installed in Ms. RABY CASTLE of Barber Lines, which have been unusually successful of operation since placed in service early in 1925.

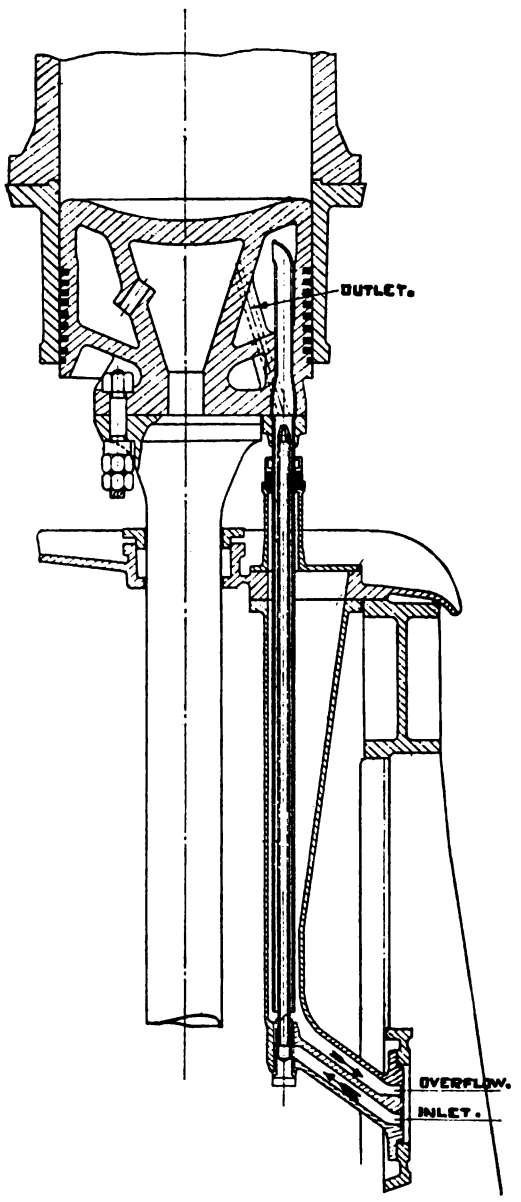
The cylinder heads and liners are of Perlit cast iron, in one piece, of sufficient thickness to allow for reboring when worn. The liners in the engines of the Ms. RABY CASTLE have not been in need of replacement and are good for a further period of operation of from 8 to 10 years. The cylinders are held into the cylinder beam by studs, the beam also acting as a water jacket, which is arranged to give the water a swirling motion as it enters, tending to improve circulation and prevent mud deposits.

The bottom portion of the liner projects below the cylinder beam and is separate from the main liner, which makes it possible to turn the engine so that the piston is on lower dead center and by lowering the bottom section, remove the piston rings or inspect the piston in a very short time and without opening the crankcase. Piston lubrication is introduced at four points into the skirt.

The cylinder head has four ports, carrying the inlet, exhaust, fuel and starting valves, the exhaust valve cage being water cooled. The large cooling space provided for each valve port necessitates the fuel valve being placed just off center, which is specially designed to insure even distribution. The pistons are water cooled on the jet system, as shown on the sectional view reproduced herewith, and it will be noted that the system has no glands under pressure, nor can the cooling water gain access to the crank case. Each piston has nine rings, the bottom one acting as a scraper ring.

The main bearings have round bottom halves and the bedplates is in common with the engine framing generally, of unusual heavy construction. The crank shafts are in two sections of three throws each.

The valves are actuated from an overhead camshaft by means of valve levers. The valve levers are mounted on oblique eccentrics carried on the reversing shaft and so arranged that a half turn of the latter shifts the roller end of the valve levers from the ahead to the astern cams. The camshaft carries ahead and astern, inlet and exhaust and starting cams and a single fuel cam which actuates ahead and astern. These cams do not have oblique eccentrics and a half turn of the reversing shaft merely moves the roller of the lever circumferentially around the cam to the position for astern running. When the reversing shaft is in mid-position all rollers are clear of cams, and the cylinder compression is broken by means of small valves incorporated with the cylinder relief valves and actuated from the reversing shaft.



Piston cooling arrangement

The reversing shaft is turned by means of an air cylinder and oil dash pot coupled to a rack which meshes with a pinion in the center of the reversing shaft and also has hand gear. The starting valves are brought into gear mechanically by means of the starting shaft, which depresses the fulcrum of the starting valve levers and so brings the rollers on to the cams.

The blast air is supplied by a three stage compressor driven from the forward end of the crank shaft. This compressor is of the steeple type, but has the hp. stage entirely separate from the lp., the hp. piston being coupled to the lp. by means of a rod passing through a gland in the lp. cover. In this design leakage past the hp. piston cannot get into the lp., and the rod allows of flexibility between the two pistons.

The lp. and mp. piston is driven from a crosshead in the crank case, thereby preventing crank case oil from entering the lp. stage.

From the compressor crosshead are driven 3 pumps, one for the forced lubricating system, and two for piston cooling drain and/or bilge suction.

In these engines all parts exposed to the combustion or to severe duty are of Perlit Iron; these include main cylinders, pistons, valve cages, valve heads, piston rings, cams, compressor covers, liners and pistons, and other details.

The last 8 Diesel engines built by the N. E. M. have had these parts of Perlit Iron, and their performance in sea service has more than justified this policy.

On the official shop trials of the engines the following data were obtained, the power being observed by means of a Heenan & Froude dynamometer.

Greystoke Castle Engine Tests

	Full Power	Overload	Reduced Power
R.p.m.	102.75	107.5	90
B.H.P.	2095	2330	1500
I.H.P.	2815	3035	2150
Mechanical efficiency, per cent	74.5	76.8	69.8
Exhaust temperature, deg. Fahr.	644	706	541
Blast air pressure, lb. sq. in.	1000	1000	900
1st Stage, lb. per sq. in.	20	20	18
2nd Stage, lb. per sq. in.	140	120	125
Lubricating oil press, lb. sq. in.	16.5	19	19
Cooling water press, lb. sq. in.	19	18	17.5
Oil per b.hp. hour, lb.	0.3875	0.392	0.393

Four Diesel generating sets are installed, two of these sets being 100 kw. and two of 65 kw. and driven by engines of the 4-cycle type.

As will be seen from the arrangement drawing the auxiliary machinery is arranged generally at the forward end of the Engine Room with the necessary control gear situated at the forward engine room bulkhead and every auxiliary has its own separate electric circuit.

Cooling water for the main engines is provided by a centrifugal pump. Inside a similar pump acts as standby and deals with all ballast duties. Two pumps are fitted for fuel oil transfer duties and standby forced lubrication respectively.

A large electrically driven auxiliary air compressor supplies air for manoeuvring purposes and in addition a small steam driven set is fitted for use when starting up. Two reservoirs of large capacity are placed in the wings of the engine room for manoeuvring air storage. An electrically driven two throw pump is provided for

in the engine room general purposes.

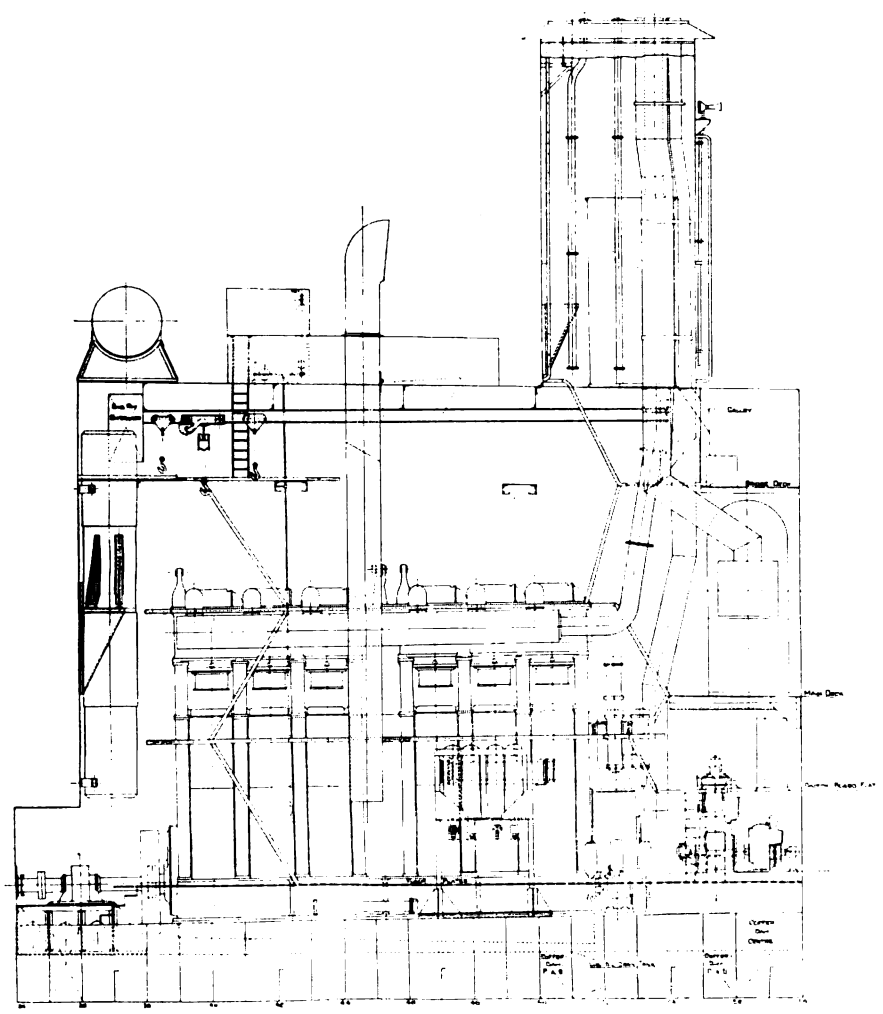
Two Sharples' purifiers deal with the fuel oil and a similar purifier is supplied for treating the lubricating oil.

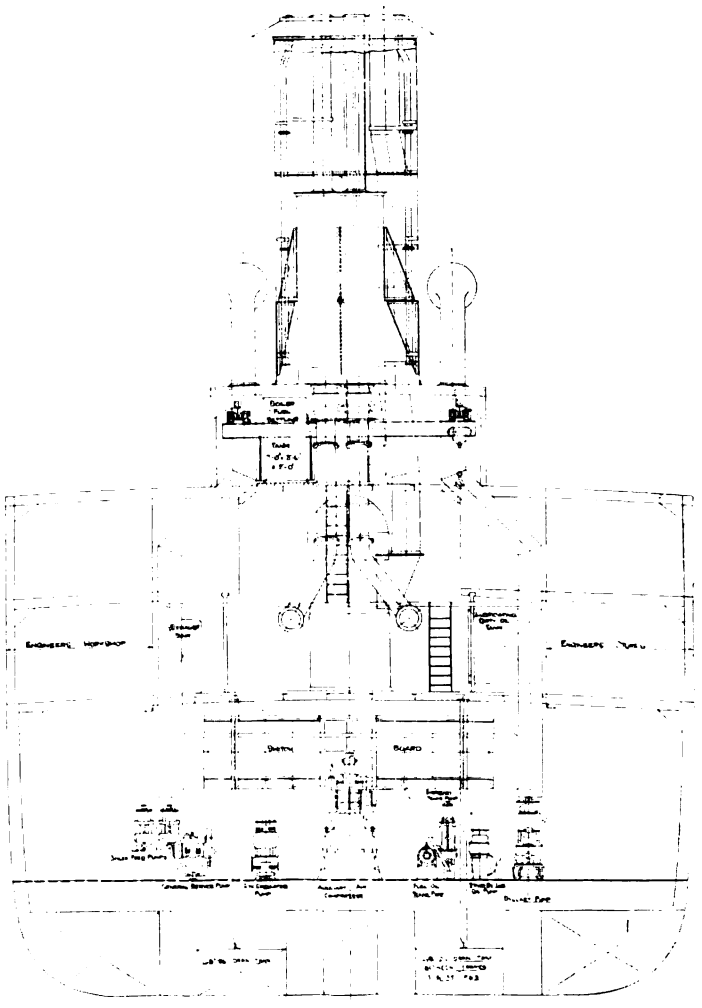
A large Cochran boiler at the forward end of the engine room supplies steam for heating and for portable cargo pumps, etc.

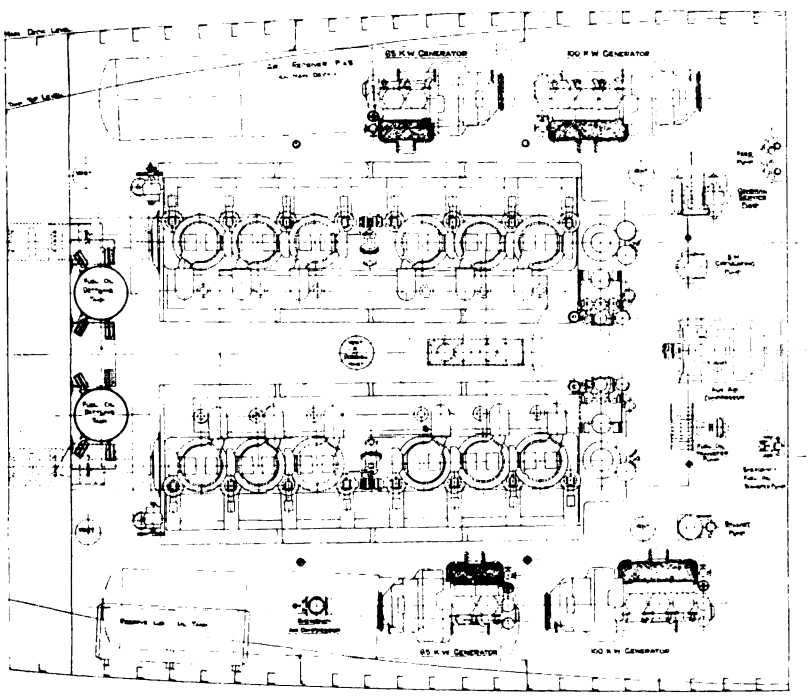
The oil burning equipment for this boiler is of the Wallsend-Howden low air pressure type.

Two duplex feed pumps are fitted and in addition a simplex pump is provided as a standby to the electrically driven oil fuel transfer pump.

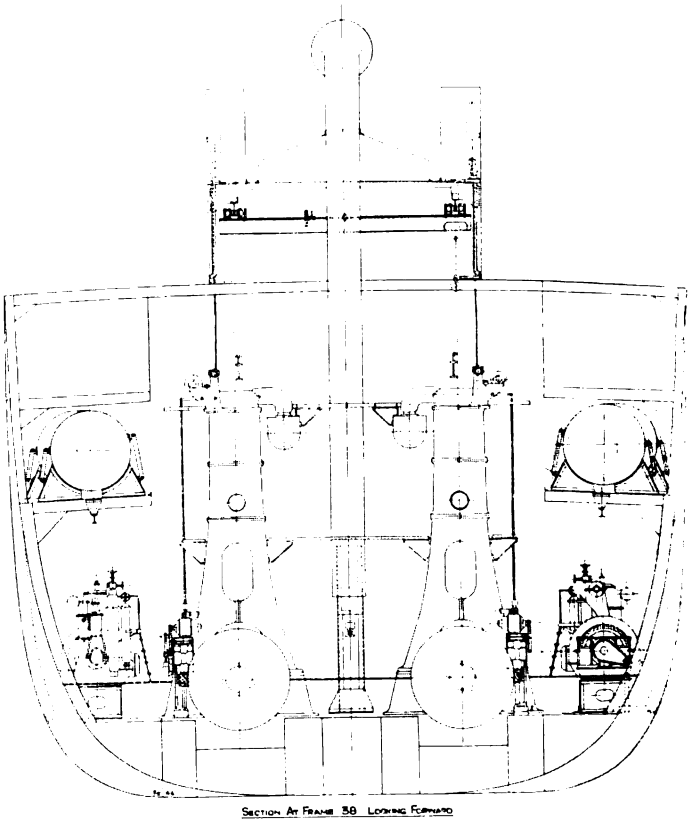
The machinery was built under the supervision of Chamber's Superintendent Engineers, Esplen & Sons, Ltd., and to the requirements of Lloyds.

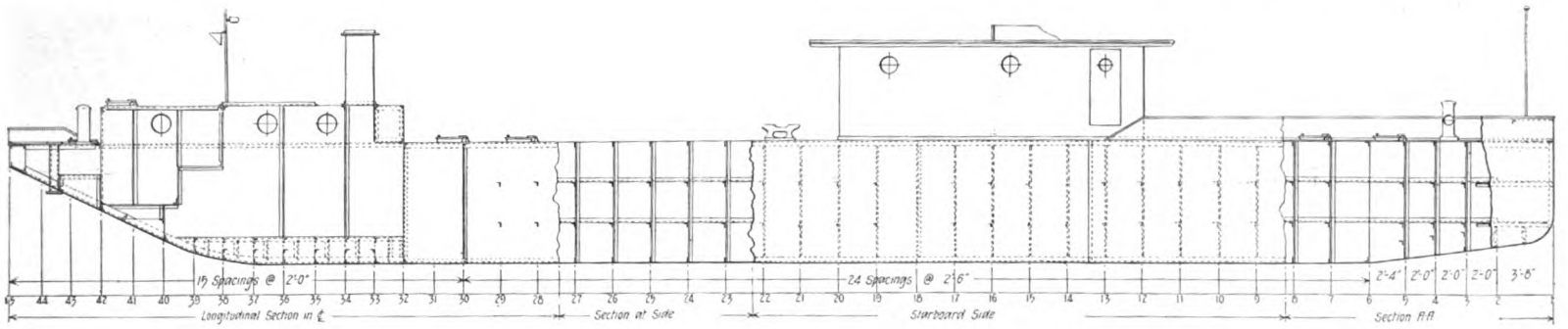






Machinery Arrangement of the Round-the-World Motor Freighter Greystoke Castle





All Welded Construction for Tank Barge

Novel Vessel Completed in Brooklyn for Canal Work Is Powered by a 125 Hp. Atlas Imperial Diesel

AN increasing recognition is being accorded to the uses of electric welding by the shipbuilding industry. This makes itself felt in a number of constructional features on shipboard. Recently there was completed the first all-steel electrically welded vessel ever built in the United States, by the S. O. S. Welding Corporation of Brooklyn, N. Y. The first ship to be built on this system is a 102 ft. tank barge which will be propelled with a 125 hp. Atlas Imperial Diesel engine.

The framing and plating is electrically welded throughout and is of an unusually strong design for vessels of this type. The frame design is based on the trussweld system, a new system of bracing transversely and longitudinally as well as vertically, originated by S. Kjerkstad, Chief Engineer of the company. The advantages claimed for this system is that it is possible to construct, in practically one piece, construction having two or three times the strength of hulls built under the regular practices with from 25 to 35 per cent less weight. It will be noted from the accompanying diagram that the bracing is of narrow channel steel, similar to that used in the construction of tall buildings. These are strung through the interior of the ship from stem to stern and are spaced about 30 in. apart. Another set is welded transversely from each side of the ship and still a third set of vertical bracings are run from the bottom to the underside of the deck.

This system makes the ship practically a rigid tank and unique tests made on the hull before launching have proved the contention of the designers. The ship was closed up tight and the whole hull put under an internal pressure of 15 lb. per square inch. Despite the fact that there were large flat surfaces exposed to the hydrostatic test the ship remained tight and sound.

Several new features were incorporated in the construction of the hull. For example, there are only six steel plates forming the entire side shell of the vessel. Both starboard and port sides from the stem to points 25 ft. aft consist of single plates with no breaks, courses or seams of any kind. In fact there are only two vertical seams on either side of the vessel from stem to stern transom. The deck strength, if required for the carrying of a cargo, is sufficient to carry a load equal to the carrying capacity of the tanks, hence she is not confined to one type of cargo and may carry a deck load in addition to a bulk cargo.

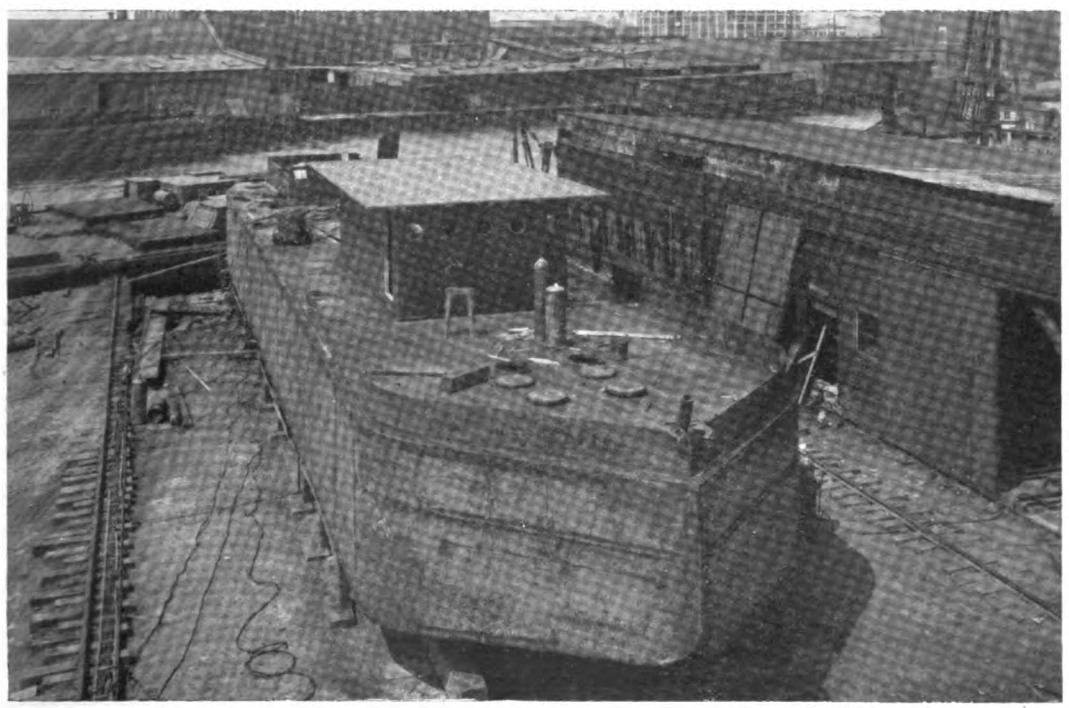
The barge is constructed to a peculiar set of requirements as she will be used on the Hudson River-Lake Champlain-St. Lawrence run between New York Harbor and Montreal. Her extreme dimensions are limited by the dimensions of the smallest lock through which she must pass in order to get out of Lake Champlain. The lock is but a few inches over 102 feet long and has a depth of seven feet. Her overall dimensions when loaded with 65,000 gal. of gasoline will be 102 ft. x 20 ft. and 6 ft. 6 in. draft. However she can carry up to 80,000 gal. of gasoline by increasing her draft. She has two rudders and is arranged with a dry storage compartment in the forepeak, with cargo tanks No. 1 and 2 starboard and port. A rotary cargo pump is located in the cofferdam, next aft, on either side are arranged two cargo lubricating oil tanks and next aft two fuel storage tanks. These spaces segregate the motor room from the gasoline cargo spaces. Next in the wings are located dry storage spaces and at the stern the after peak tank for fresh water.

There is a steel house on deck containing pilot house and sleeping accommodations. This deckhouse is entirely built of steel plates and most of the furnishings are of metal. The trunk house over the motor room forms a galley and mess room.

Complete 4-in. welded cargo suction lines are installed with all tanks separately controlled with branch valves from the deck. The cargo pump is operated by a 10 hp. vertical gas engine located in the main motor room. The driving shaft extends through the bulkhead into the pump room.

The entire engine room and galley aft of the cofferdam contain no inflammable material and all equipment including galley fittings and dishes is made of metal to minimize the fire hazard. Accommodations for a crew of six are provided on deck.

The electric welded method of construction is now being adapted to other designs for marine purposes. Included in these designs are dredge hulls, carfloats, deck scows, pile-driver hulls, fuel barges, etc., all of which may carry part liquid and part deck cargoes as may be desired. It is claimed that vessels of this type can be constructed at much less expense than can riveted framed types of steel vessels.



Diesel powering is used on this electrically welded gasoline carrier

Recent Literature

"Marine Diesel Engines"

"*Marine Diesel Engines*," by W. C. MacGibbon, (Glasgow, James Munro & Co., Ltd., 474 pp. 8½ in. x 5¼ in.), is primarily an operating engineers' handbook, covering essentially the same subject-matter as Sothern's "Verbal Notes and Sketches."

The book is not distinguished in method from other representatives of a class of literature whose aim is to make the technicalities of the Diesel engine comprehensible to the man who spends his life at sea and whose educational range may be circumscribed by that fact.

Like the author of many similar books, the writer of "Marine Diesel Engines" starts from the premise that there are many items of an essentially technical nature whose understanding would be useful to the operating man. He "covers" them with a methodical comprehensiveness, but does not eliminate doubt as to whether the man on watch who conscientiously reads each of the sections can actually respond to them. The author is by no means alone in this difficulty, and it is only fair to say that his failure to master it is not as complete as that of the majority of his colleagues. What operating engineers are looking for is not another repetition of previous efforts to tell them something which is difficult to explain and difficult to comprehend.

Each of the authors who has failed in the task has had his own particular way of falling short, but the commonest one seems to be lack of analysis. It is one thing to describe, and quite another to explain.

Naturally enough it has been assumed that explanations must be avoided because they allegedly lead into the realms of pure science and thermodynamics, where it would be impossible for the unschooled mind to follow. It is a disappointment that a writer who is as methodical and industrious as MacGibbon should have gone down before this same defeat before he started, for if he had not the general thoroughness of the book would have made an epochal work of it.

The basis for this criticism is of course the conviction that it is really possible to make the man on watch understand Diesel technology. If this is not admitted and the assumption upheld that the operating man will never be able to escape from the rule of thumb, then MacGibbon's book must be classed as excellent, because it does everything that can be done short of conveying real comprehension.

As a basis for the treatment of Diesel engine design fundamentals, Lloyd's Rules are reproduced and illustrated by means of concrete examples showing how the rules work out in illustrative cases. Examples of complete designs, such as that of Burmeister & Wain, Doxford, etc., are descriptively covered in the usual sort of chapter that occurs in this type of book. It is difficult to understand why such chapters are written in view of the fact that the man to whom they are addressed generally obtains a much better notion of how the engine is built up from working on it. Take away the author's literary endowments and his operating audience is much more than a match for him.

Merchant Vessels of the United States

The 1927 edition of Merchant Vessels of the United States, 976 pages, may be obtained from the Superintendent of Documents, Government Printing Office, Washington, for $1.75. It contains the name of every documented merchant vessel and yacht of the United States, approximately 28,500, the tonnage, dimensions, year, and place of building, service, and number of men composing the crew, together with the name and address of the owner. It shows separately the steam, motor, sail, and unrigged merchant vessels and similarly, the yachts. It contains also the name of every documented merchant vessel and yacht which was lost, abandoned, sold to aliens, or removed for other causes during the year. There are lists of oil-burning steamers, vessels measured under Panama and Suez rules, vessels belonging to the Navy, War, Treasury, Commerce, Labor, and Interior Departments, the Panama Canal and Panama Railroad Company, and vessels owned in the Philippine Islands. The vessels are arranged in the alphabetical order of their names.

The Directory of Shipowners, Shipbuilders and Marine Engineers, 1928

Compiled by the editor of our London contemporary, *Shipbuilding and Shipping Record*, this is a book which, literally, no one in the shipping or allied industries should be without. The 1928 edition is as replete with information as its predecessors. Shipowners, their officials, their fleets and particulars thereof, lists of shipyards, marine engine shops, dry docks, etc., telegraphic addresses of shipowners, technical societies—these are the principal contents. The book is useful and reliable. Such mistakes as there are, due to careless proofreading, are faults from which no annual can escape. The book can be obtained through MOTORSHIP'S technical book department.

Motorship Reference Book for 1928

Published by the Temple Press, Ltd., London. 228 *pp.*, 5¾ *ins. x* 8¾ *ins.* This little handbook of our esteemed London contemporary is always as welcome as it is informative. It contains information on history and progress of the motorship; principles of operation of oil engines; Lloyd's rules for the construction and survey of motorship machinery; list of motorships under construction as well as a list of those already in service; a map showing world motorship bunkering stations; statistics on motorships and motorshipping; a glossary of terms; a comprehensive section is devoted to Diesel engines. The volume is well illustrated with photographs and drawings, and is indexed for quick reference. A.C.H.

The Beacon Oil Company of Everett, Mass., plan to build a duplicate of the coastwise Diesel tanker COLONIAL BEACON which was described and illustrated in the April issue of MOTORSHIP.

Cox & Stevens have called bids for a 143 ft. Diesel driven trawler of 600 s.hp.

The Archbold Coal Co. of Evansville, Ind., have installed a 40 hp. Fairbanks-Morse oil engine in their towboat. Evidently they know that Diesel power is more economical than coal.

More Railroad Towboats

Two big Diesel electric railroad towboats are shortly to be constructed for service in New York harbor. One of these will be for the Pennsylvania Railroad and the other for the Long Island Railroad. The Pennsylvania boat will, it is understood, be a duplicate of those already owned and in service.

New Silencer for 4-Cycle Diesels

A new model Maxim Silencer, known as the Model FG, has been announced by the Maxim Silencer Co., Hartford, Conn. This new type is for use on 4-cycle Diesel and gasoline exhausts. For many months, Maxim engineers have been developing this new, compact silencing unit with the result that the FG unit is smaller, lighter and less in cost than previous types used for 4-cycle engines. It is applicable to both stationary and marine installations and in the marine work. The reduced size and weight are regarded as being of great importance. The FG silencer works as well as if not better than the previous models used for this work. It has been thoroughly tested and proven entirely satisfactory. Specifically, its advantages are:

1. It is smaller and lighter than any device proposed for quieting exhausts from 4-cycle engines. 2. It transmits no noise through the shell (shell noise is distinct from exhaust noise). 3. It will give practically complete elimination of the exhaust noise, being equal or superior to the Maxim Silencer previously used for such work. 4. Being much smaller and lighter than previous models, it is easier to install. 5. It imposes negligible back pressure. 6. The entire silencing unit can be withdrawn with the inlet head and then easily cleaned, part by part. With proper operations, however, 4-cycle Diesel engines should not be particularly dirty. 7. The FG Silencer is less expensive than the previous Maxim Silencer.

The medal of the American Society of Naval Engineers was recently awarded to Henry F. Schmidt, Consulting Engineer of the Westinghouse Electric & Manufacturing Company, South Philadelphia Works, for the best article submitted during the year 1927. Mr. Schmidt, besides being awarded a gold medal, was given an honorary life membership in the society and a cash prize for his excellent and well-illustrated paper, entitled "Some Screw Propeller Experiments with Particular Reference to Pumps and Blowers."

The presentation of the awards to Mr. Schmidt was made by Secretary of the Navy Wilbur at the annual dinner of the society which was held at the Willard Hotel, Washington, D. C.